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The Oil Man's Calendar

SEPT.	
30	**American Gas Association, San Francisco.**
OCT.	
1	**American Gas Association, San Francisco.**
2	**AIME Regional Meeting, St. Louis.**
5- 9	**National Safety Congress and Exposition, Chicago.**
8-10	**Texas Mid-Continent Oil and Gas Association, Dallas, Texas.**
12-14	**American Society of Mechanical Engineers, Rochester, New York.**
12-17	**AIME, Petroleum Division, Los Angeles.**
19	**National Stripper Well Association, Wichita, Kansas.**
20-21	**Independent Petroleum Association, Wichita, Kansas.**
29-31	**AIME, Petroleum Division, Austin, Texas.**
30-31	**Illinois Mineral Industries Conference, Urbana.**
NOV.	
5- 6	**American Association of Petroleum Geologists, Los Angeles.**
6	**California Natural Gasoline Association, Los Angeles.**
9-13	**American Petroleum Institute, Stevens Hotel, Chicago.**
16-18	**American Institute of Chemical Engineers, Netherlands Plaza Hotel, Cincinnati.**
17-21	**National Chemical Exposition, and Industrial Conference, American Chemical Society, Chicago.**

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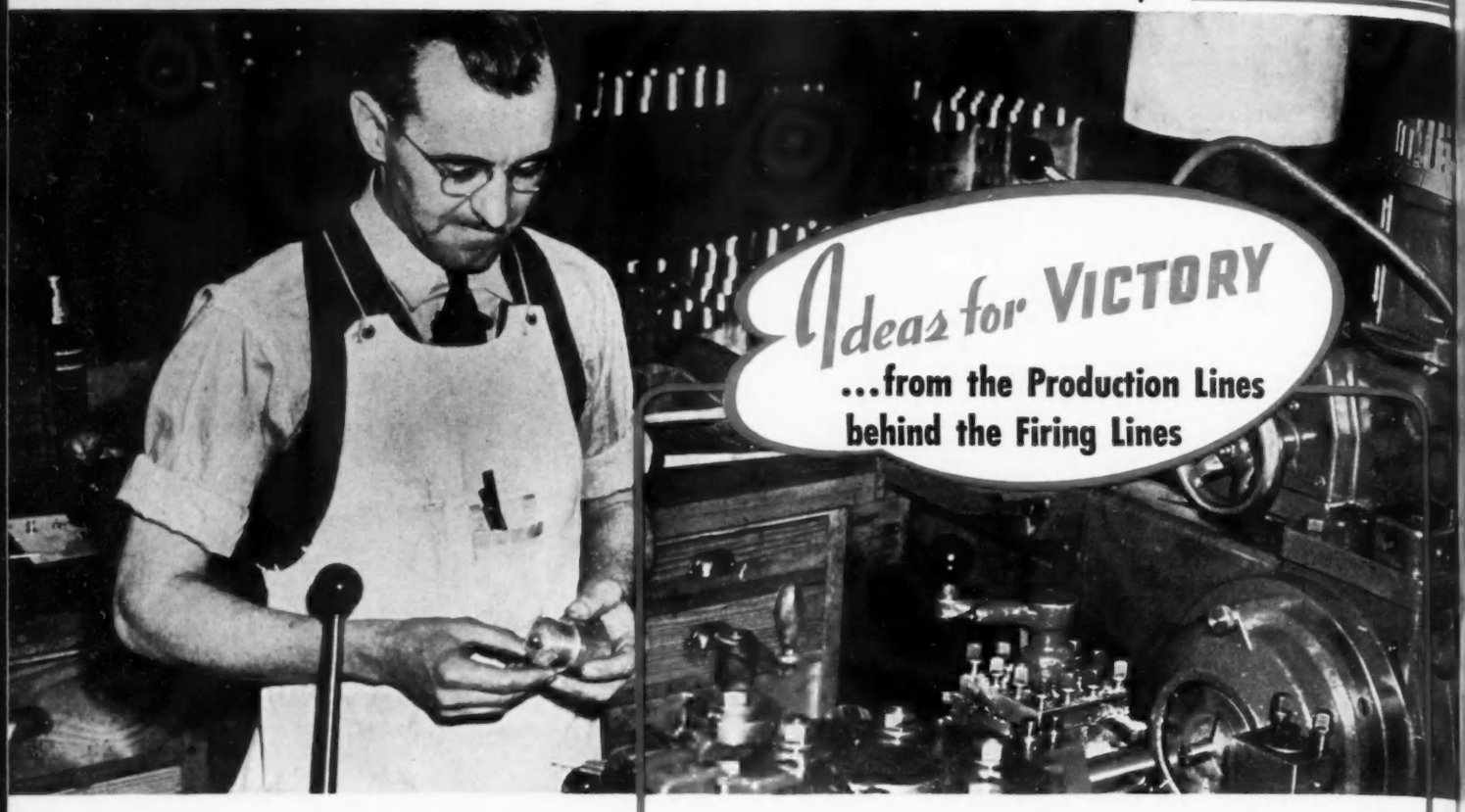
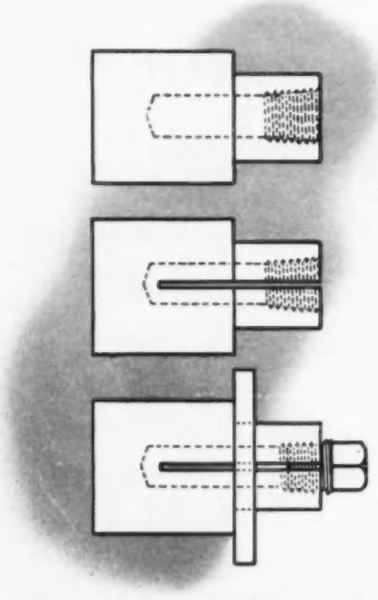
A CITATION FOR MEN IN WAR INDUSTRY





One suggested method for holding second operation work, requiring location from the bore: A piece of stock is turned, slotted, and tapped with taper thread. Work pieces are loaded on this plug. A pipe plug is then used to expand and tighten the arbor against the internal diameter of the work piece.

He Didn't Wait for a Tool Room Arbor!

J. H. Medling, with the Aro Equipment Co., Cleveland, developed a relatively simple plug to hold small diameter washers quickly and accurately without losing valuable time waiting for a special arbor to be made up in the tool room.

The accompanying drawing shows operator Medling's "Idea for Victory"—an idea which may be helpful to other operators.

Many operators are resourceful and ingenious in finding ways to produce more finished pieces on their turret lathes.

Many of these ideas are sent in by operators, to be published in "Blue Chips," a timely shop bulletin mailed regularly to turret lathe operators on our list. Are your turret lathe operators getting Blue Chips? If not, we will gladly send it to their homes.

YOU CAN TURN IT BETTER,
FASTER, FOR LESS...WITH A WARNER & SWASEY

WARNER & SWASEY
Turret Lathes
Cleveland

The Changing Panorama

Not High Hat Just Red Tape

PITY the poor oil man who takes a government post in Washington. He hasn't gone high-hat; he's just a victim of officialism.

Like the Army, the government is run on a purely impersonal basis. It can't operate any way but formally, and no matter how high a man may be in his industry, he's just part of the machinery when he gets to Washington. And since his friends "back home" often can't realize that—well, he's in a spot.

Take, for example, a well known oil company official now serving the government in a responsible position in Washington. Bill Jones, for convenience.

Back in the oil country, Jones has—maybe had is better—a host of friends. They called him "Bill," visited his home, were members of the same clubs.

So when Bob Smith found himself up against a priority problem, naturally he wrote Jones in Washington. That was the proper thing to do, but what he wrote went something like this:

"Dear Bill: Things are going along out here about as well as could be expected until Henderson sees the light and gives us a better crude price. The Missus met your wife on the street yesterday, and says she's looking fine. Frank Roberts is laid up with a busted leg, and with you gone the foursome's badly broken up. By the way, I'm in a devil of a fix; I have to get some hole stretchers in a hurry and I need a priority. Fix it up for me, will you?"

Now, that's all right for Smith out in Sourgas Creek. But Jones in Washington can't write chatty letters on government stationery. The form and tax of official letters is fixed by experience, precedent and practice, something like this:

"Dear Sir: Replying to your inquiry of July 1 regarding priority on hole stretchers, you are advised that Form PDQ-109-abc should be filled out and filed with the priorities branch, Division of Industry Operations, War Production Board," etc.

Jones knows his formal reply is going to irk Smith, who put his formality in moth balls along with his dress suit after he was married 22 years ago. So, when he gets a chance, he frequently slips a note into the envelope:

"Dear Bob: The accompanying letter is the formal hogwash which the government requires. I have to be official because everything goes into the records. Glad to hear things are moving along—."

But Jones is busy, and he can't always find time for these little notes. And he's very much afraid that the fellows back home think he's gone high-hat, when he's only trying to do a big job within the restricted machinery of government.

He's working 12 to 15 hours a day, away from the comforts of home in what can be a darned uncomfortable, crowded city, where you stand in a restaurant half an hour or more before you can get a table, where you pay high for a comfortable room—if you can find one, where you have little time and often are too tired to make friends. He may be serving at something of a financial sacrifice. He's lonely and he misses his wife, his friends and his pleasant club. His only compensation is a faint hope that he may be doing something to help win the war.

Don't think he's gone high-hat; he's just tangled up in red tape.

War Workers Need Gasoline and Tires

AMERICAN war workers must be able to get to and from work if production of military arms is not to suffer materially. In the United States this means the free use of private automobiles for industrial purposes, less than 20 percent of the nation's workers normally depending on commercial vehicles.

Already output of war plants in some East Coast areas is suffering as a result of gasoline shortage. Some workers are not getting to work regularly because filling stations have no gasoline to sell them, although workers may have sufficient ration coupons. Others arrive late and weary, due to spending valuable time trying to find filling stations with gasoline on hand. This situation is caused by restriction of filling station deliveries to 50 percent of last year's sales, and will be at least partly cured when permanent rationing plan becomes effective July 22 and the value of ration coupons is reduced from 6 to 4 gallons.

However, the current situation is but a small hint of what will happen when tires wear out.

WPB On Scrap in Hands of Dealers

BECAUSE of reports which have been circulated throughout the country to the effect that there are great quantities of scrap rubber and metal in the hands of some scrap dealers who have been unwilling to sell their scrap at the prices determined by the government, the publisher of THE OIL WEEKLY wrote a letter to Donald Nelson, head of the War Production Board, asking answers to several questions relating to scrap stocks.

Under the signature of Lessing J. Rosenwald, chief of the Conservation Division of WPB, a reply came back promptly which answers in part some of the questions raised.

Here is the letter written to Nelson:

"I have read with the greatest of interest newspaper reports in the papers of yesterday to the effect that it may be necessary to take ornamental iron from homes, fences, etc. to supply necessary steel and iron scrap and if the situation comes to the point where the use of such material is necessary I feel sure that other Americans will join with me in turning over to the government such ornaments which have been acquired at an expense far in advance of the price of scrap.

"I find it very difficult, Mr. Nelson, however, to reconcile the expression of such great need with reports which are current throughout the various parts of the United States.

"As a person who has been engaged in public relations work for more than two decades, I would like to suggest to you that if the reports of which I am about to speak are not correct they should be set straight immediately and if they are correct the government is sadly at fault in not doing something about it.

"I refer to the reports which I have heard all over the United States to the effect that there is a great deal of scrap steel and rubber in the hands of scrap dealers who will not sell it at the prices the government is now paying. If these reports are not true then it is in the public interest for your board to say so.

"If they are true, then it would seem to me that action should be taken by your board to get in scrap before you ask people to give up materials actually

in use while scrap lies idle in the junk yards.

"Our publications took a very active part in an effort to bring out scrap from the oil fields of the United States, an effort which was reasonably successful so there is no question of any lack of collaboration on our part with the government but rather the question of a natural interest.

"I should like to know, Mr. Nelson, if a survey has been made of the scrap in individual scrap and junk yards in all communities and if such a survey has been made, how much there is, and finally why this scrap is not being put to use. . . ."

Here is the reply from the War Production Board, signed by Lessing J. Rosenwald:

"Your letter dated June 26 to Mr. Nelson has been referred to me for attention. First, let me tell you a little about the steel scrap situation. Last winter when our bureau started on iron and steel scrap salvage there were forty or more furnaces shut down for lack of scrap material. During the month of May this was reduced so that we had no furnaces in the United States shut down because of lack of scrap material. Since that time two furnaces have been shut down for two consecutive weeks, due largely to difficulties with prosecutions by the Office of Price Administration for violation of ceiling prices paid for iron and steel scrap. These two furnaces are the only ones shut down at present for lack of material and we are bending every effort to alleviate this situation to enable them to resume operations at the earliest possible moment.

"All of this has been accomplished with an enormous increase in steel production, the largest this or any other country has ever seen. It is now our purpose to accumulate scrap metals in the hands of the steel companies so that they will have an inventory sufficient to carry them over the winter months where scrap collection is difficult. The movement of scrap in and out of scrap dealers' yards has also been enormous, greater than ever before, and often taxing the yards to more than capacity. It has been difficult to obtain sufficient labor to process this scrap in the hands of the dealers and steps are being taken to remedy this situation.

"While there may be some hoarding of scrap, I am convinced that most of the dealers have been doing a splendid job of moving this scrap into the yards of the steel mills and will continue to do so. I believe there is little or no hoarding for higher scrap prices. The oil industry has cooperated splendidly in the contribution of iron and steel scrap.

"In the case of rubber we have had a different situation. Until recently the price of mixed scrap rubber was so low that in many parts of the country it was impossible to move this scrap from its location to the reclaiming plants. This condition has been corrected by establishing a uniform price on mixed scrap rubber of $25 per ton, f.o.b. cars at point of origin, and this new price should permit all owners of scrap rubber to move their stocks into the reclaimers' hands. As you know, we have been having an intensive rubber campaign and the amount collected will take some time to move from the places of collection into the rubber dealers' yards for processing. This will result in apparent accumulations of scrap rubber until such time as these accumulations can be moved. Insofar as the dealers themselves are concerned, they have contracted to sell many thousands of tons to the Rubber Reserve Corporation who will buy unlimitd quantities and will ship same as soon as they receive shipping directions from Rubber Reserve. Therefore the rubber you see in junk yards may already have been sold to Rubbr Resrve or contracted to be sold to Rubber Reserve and merely awaiting orders to ship.

"With regard to both steel and rubber we are making every effort to see that scrap is moved from the processors into the hands of the ultimate users as rapidly as possible and I believe that satisfactory progress is being made. . . ."

Russia's Oil Supply Not All in Caucasus

THE menace to Russia's oil supplies by the German drive is receiving a great deal of attention at the hands of American news commentators. The most sensible comment at this time appears to concern the cutting of Russia's petroleum supply line rather than any immediate increase in oil supply Germany might get through capturing the oil fields in the Caucasus.

That the Caucasus fields and refining installations will be thoroughly demolished before the Germans could take them is well within reason in view of Russia's "scorched earth" practice. To rehabilitate the fields and refineries would take a long time.

What the Germans probably have in mind is the cutting of the supply line from the Baku region to the industrial regions of Russia and to the fighting front. However, serious as the cutting of the supply line around Stalingrad and Rostov might be, the fields themselves have the protection of mountainous regions which would make their capture very difficult and as long as the fields remain in Russian hands there are waterways from which oil can still be fed to the Russian armies.

Also, far to the east is the Ural producing region of present unknown capacity. Russia received from the United States very heavy shipments of drilling and other oil country equipment year before last and the understanding in the United States was that most of the drilling to be done with these rigs would be in the Ural area. Statistics on the production of this region are not very up-to-date but we believe that it can be assumed that Russia has developed her reserves in this area to the point where her crude petroleum supply from that section is probably greater than the supply now enjoyed by all of the Axis allies combined.

In other words, the supply line through Stalingrad is no Burma road, the cutting of which would stop all supplies.

The Rubber Scrap Campaign

WHILE the rubber scrap campaign just closed did not bring in as much rubber as many had hoped, the oil industry can take a bow on the job it did. As has been said more than once, the campaign was put under way by Presidential statement before arrangements had been completed by the oil companies to handle the rubber, and this hurried start did not do the campaign any good. But oil company support produced a large amount of scrap rubber in spite of this handicap.

When will the government realize that campaigns of this nature have not only to be carefully planned, but that time must be given to put the campaign plans into effect? We certainly hope the WPB scrap campaign to bring in scrap metal is more judiciously handled.

At New Orleans last week an automobile was propelled 23.7 miles on one gallon of hydrolene, said by Louis A. Block, its developer, to be "50 percent water and 50 percent new species of hydrocarbon." Block was quoted as saying he thought he had the answer to Eastern gasoline rationing, but refused to say more pending a visit to Washington where scientists will test his fuel. He is said to have two formulas, one for automobiles and one for airplanes.

WASHINGTON ROUNDUP

By B. F. LINZ
Washington Correspondent

»

Senate Committee Approval of Mansfield Bill Presages Drilling Control Fight

»

Pipe Line Relocation Projects Get WPB Approval

»

WPB Makes Transportation Pool Participation Compulsory

☆ ☆ ☆ ☆

A THREE-WAY struggle for control of oil-industry operations was precipitated last week by the action of the Senate commerce committee in approving the Mansfield inland waterway development bill with an amendment by Senator Lucas of Illinois scrapping the OPC 40-acre rule for wells not exceeding 3300 feet in depth and the WPB conservation order prohibiting the use of material without authority. Ickes disclosed that he was preparing to go to Congress in opposition to the amendment and that WPB was ready to fight that section permitting the drilling of wells without restriction by operators who had the materials and equipment in hand.

Also included in the bill was the Trans-American pipe line, and the Florida pipe line already under way.

Aside from the Lucas amendment, observers saw little importance in the Mansfield measure, which merely authorizes the projects, pointing out that the real test would come when the Mansfield-Pepper group attempted to secure the appropriation of the $93,000,000 provided for in the bill. It was recalled that President Roosevelt sometime ago said Congress could pass any authorizations it saw fit to, indicating that he would not interfere until it came time to approve the funds to carry them into effect.

Drilling control also came up for discussion at the state regulatory body meeting in Washington, whose members adopted a resolution requesting that a copy of each application for exception to OPC and WPB rules be filed with the appropriate state agency, thereby permitting the agency to take steps to have the exception applied on a field-wide basis if thought desirable. It was explained that large operators with their large staffs were able to take steps seeking exceptions, but that frequently small operators were not, and that this procedure would protect the small operator.

A progress report of the various pipeline projects was made available by the coordinator's office during the week, with announcement that WPB had granted a complete line of clearances, and it also was reported that pipe for the "big-inch" line was beginning to move into the field.

In the making as the week drew to a close were new WPB orders which may include licensing of East Coast dealers, designed to protect against price war and "invasion" of the field from the interior as a result of the recent increase in gasoline prices, and a showdown between OPC and WPB over the retention of the 50-percent curtailment on deliveries.

The new rationing system continued to be a leading subject of discussion as millions of eastern motorists again went to school—to get ration books. The situation, and particularly the drive for conversion from oil to coal, was not helped by garbled newspaper reports of statistics compiled by OPC which showed that if all present plans are carried out and 200,000 barrels a day can be secured by tanker, there will be slightly more than the present minimum rationed need delivered to the East by the end of the year. Newspapers seized upon the "surplus" which the report showed, leading many in the ration area to believe that their troubles would soon be over. Many orders for conversion of home heaters were canceled and OPC had a hectic time trying to offset the influence of the stories.

This week the Petroleum Industry War Council will hold its monthly meeting, postponed because of the scrap rubber drive. Probable major subjects of discussion will be the fuel-oil-supply situation, the results of the rubber salvage drive (probably from the "where do we go from here" angle) and the projected WPB controls on the transportation pool.

☆

MANSFIELD BILL: By a vote of 11 to 3, the Senate commerce committee on July 10 made a favorable report to the Senate on the $93,000,000 Mansfield bill, retaining the Trans-America pipe line project from the Tinsley field to Charleston or Savannah, to cost $13,000,000 and the $10,000,000 trans-Florida pipe line, as well as the Lucas amendment knocking out the 40-acre spacing requirement for wells of not exceeding 3300 feet.

The Senate agreed to begin debate on the legislation July 15.

Under the Lucas amendment, the spacing requirement would be relaxed to provide for one well on 10 acres in sand formation and 20 acres in limestone and no restrictions could be applied to the drilling of wells where the operator had the necessary materials and equipment in hand.

Opposed to the measure were three of the smartest members of the committee—Senators Bailey of South Carolina, who acted as chairman of the subcommittee in charge of the bill; Vandenberg of Michigan, and Burton of Ohio. For the bill were Senators Pepper of Florida, its Senate sponsor; Radcliffe of Maryland; Mead of New York; Bilbo of Mississippi and Hill of Alabama; and, by proxy, Wallgren of Washington; Clark of Missouri; Caraway of Arkansas; O'Daniel of Texas; Overton of Louisiana and Lee of Oklahoma.

OPC and WPB to Fight

From his conference room on the fifth floor of the new Interior building, Coordinator Ickes on July 9 characterized the Lucas amendment as "the most vicious bit of legislation, so far as conservation of oil is concerned, that I have seen."

Ickes gave assurance that he would take his opposition to Congress in an effort to defeat the amendment and disclosed that WPB is prepared to fight it

also, because it would cut across WPB power with respect to priorities.

☆

POOL: Orders making participation in the East Coast transportation pool compulsory and possibly providing for the licensing of companies to do business in the area are in process of formulation in WPB.

The regulations will be designed to protect the present competitive position of East Coast members of the industry, now threatened by invasion from the interior and a possible price war.

Discussions are going on between OPC and WPB officials, and while no decisions have yet been reached they are said to be in accord that something must be done to preserve the recent 2½-cent increase in gasoline prices granted by Price Administrator Henderson.

It is expected that the orders will provide for a complete audit of the books of companies participating in the pool and an "exacting" control by OPC, although it has not been decided whether this will be accomplished by licensing.

It was explained that the price increase was made to pay the cost of transportation which the companies had been bearing, and that if advantage is taken of the increase by persons or companies formerly not marketing in the East the purpose of the increase will be defeated. This would be accomplished, it was said, by a consumer in the territory ordering supplies direct from Texas and putting the 2½ cents in his pocket instead of in the pool. To avoid this, it may be found necessary to require all persons operating in the East to be members of the pool.

Any action taken by WPB will be subject to the usual review and clearance of the Department of Justice, which already has been appraised of the situation and the broad outline of the plan to deal with it.

State Agencies Want Part in Drilling Exceptions

Members of the state regulatory bodies, meeting in Washington July 9-10 for the second time since their incorporation as part of the advisory organization of OPC, sought to give the small operator a "break" by extending to whole fields or pools exceptions from M-68 which may be granted by OPC and WPB.

An exhaustive discussion of this phase of the situation was followed by the adoption of a resolution offered by S. F. Peterson of Illinois, requesting that a copy of each application for exception be filed with the appropriate state agency for consideration, so that, if desirable, the agency would be in position to have the exception applied on a field-wide or pool-wide basis.

It was explained that the large operators, with their comprehensive engineering and scientific staffs, are in a position to determine where exceptions are desirable, while the small operators, with their very limited resources, cannot develop the necessary basis for applications.

Under the resolution, it was pointed out, the small operators could be given the advantages of the large companies' studies and determinations and give a measure of protection they do not now enjoy.

The regulatory group also adopted a resolution requesting revocation of Recommendation 47, which prohibits abandonment of wells without OPC permission.

Officials of several states took the position that the need for the restriction has passed. The recommendation followed disclosures that the then great demand for casing was leading many operators to abandon small wells and sell their equipment, a condition which apparently has died out. OPC officials reported that 234 requests for permission to abandon had been received, of which all but three were granted.

There was considerable discussion of the desirability of adopting a uniform method of reporting crude production, it being agreed that there is need for action along that line because of the varying reliability and completeness of reports of the several states.

However, it was agreed, a further study should be made, and a special subcommittee, consisting of William J. Armstrong of Oklahoma, Olin Culberson of Texas and P. J. Hoffmaster of Michigan, was appointed by Hiram J. Dow of New Mexico to make an investigation and submit recommendations through him as to the type of system which should be adopted.

At their final session, the state officials heard Coordinator Ickes strike vigorously at the Lucas amendment to the Mansfield Inland Waterway Bill.

Ickes declared that the very magnitude of the war demand and the uncertainty as to the war's duration, make "sensible conservation" more urgently necessary that ever before, and that the hanging of an amendment to scuttle well spacing regulations on the measure was an example of ill-advised proposals.

"As all of you know, this amendment was introduced by Senator Lucas of Illinois, to the plaudits of those who have shamelessly dissipated the oil resources of that state," Ickes asserted. "The bait for East Coast senators, of course, is that this amendment will—so it is pretended—automatically end the supply difficulties on the Atlantic seaboard.

"What the advocates of this amendment don't mention, of course, is that the drilling which it would authorize would take more steel than the big pipe line which we are about to start—but will mean less oil for the Eastern market. What they don't mention is that it will mean drilling for the skimmed milk of the shallow fields, leaving no steel left over for deep drilling into more productive horizons."

The next Washington meeting of the state officials will be in October, when it is planned to have them meet with the Petroleum Industry War Council.

☆

PRICES: Legislation taking control of petroleum prices out of the Office of Price Administration and vesting it in the Petroleum Coordinator has been introduced in Congress by Senator Guffey of Pennsylvania.

Guffey, explaining his bill in the Senate, said that during the last war he served on the Petroleum War Industries Committee which, he pointed out, "was all under one management, in the hands of one committee."

"I am sure that if the regulation of the petroleum industry could be placed under a committee in OPC we should have less trouble and less interference," he said.

☆

RATIONING: Some 10,000,000 Eastern motorists registered for gasoline rations last week for the second time in three months, facing the certainty that many who have been riding on "B-2" and "B-3" cards will receive nothing beyond the basis "A" card of 48 coupons, each valid for four gallons, which is expected to last them a full year.

Street-car and bus companies in defense communities—which comprise a

large proportion of the whole area—sought frantically to increase their facilities in the face of WPB orders which froze deliveries of cars and buses effective July 18, apprehending that many thousands of cars now transporting workers to their jobs will be laid up when the new rationing system goes into effect, throwing a tremendous burden upon public transportation systems.

Meanwhile, the many protests from war workers that the 50-percent curtailment in deliveries was cutting supplies so that they could not get gasoline to ride to work, which led to OPC orders to increase deliveries in a number of such areas, brought from the War and Navy Departments and OPC a joint appeal to all motorists to discontinue immediately "all non-essential uses" of gasoline.

"Motor gasoline stocks have been drawn on so heavily from filling stations by 'driving as usual' that, in many areas along the Eastern Seaboard, scores of war workers have been unable to obtain enough gasoline to get them to their jobs," the joint statement declared. "This condition threatens to hamper seriously our war-production program.

"The diversion of transportation facilities ordinarily used in the movement of motor gasoline to the East Coast, to the movement of strategic war materials, has the effect of reducing the stocks of motor gasoline available for all purposes. There is not enough gasoline for 'driving as usual' and no change in this condition in the gasoline supply situation is anticipated in the near future."

A brighter picture, however, was drawn in an announcement by the Office of Defense Transportation that its orders restricting the use of tank cars for hauls of less than 100 miles has released thousands of cars for long-haul service.

During May, it was stated, 125,000,000 gallons of oil and products were moved by tank truck to destinations served in the preceding month by tank car, representing 14,200 car loads and, on the basis of a monthly average of three and a half hauls of 100 miles or less, releasing 4000 cars. A far greater diversion from rails to road is indicated for June, it was said.

The cars released have been put to hauling oil into the Atlantic area and other essential services, ODT said, but, it warned, "this does not mean that the threat of a fuel-oil shortage this winter is removed or that the current shortage of crude oil at Eastern refineries is likely to end immediately."

It was revealed on July 8 that when

[*Continued on page 42*]

WPB Approves Huge OPC Pipe Line Relocation Program

WAR Production Board clearance for all pipe line projects contemplated in the OPC relocation program (THE OIL WEEKLY, June 29) was announced by Coordinator Ickes July 7.

More than 30 separate undertakings are involved in the seven-project program, the cost of which, estimated at more than $30,000,000, is being financed by the industry, with new materials to be used only where second-hand pipe, pumping facilities or other equipment cannot be obtained or employed.

The WPB clearance, it was explained, covers the small amount of new materials which will be required and, said Ickes, "if early approval can be obtained for all units on which we propose to go ahead, the entire program can be completed within six months, and in three months a majority of the projects will be in actual operation."

The over-all relocation program is designed to increase the flow of crude oil and products to the Atlantic Seaboard by more than 200,000 barrels a day, 87,000 of it by pipe lines exclusively and the remainder by pipe line to Mississippi and Ohio River and Illinois points, thence eastward by tank car and river barge.

At the same time, Secretary of Commerce Jesse Jones announced that Defense Plant Corporation will buy the 195-mile 8-inch line operated by the American Liberty Pipe Line Company between Longview and Houston, to be moved and relaid across Florida. Purchase price of the line will be $1,200,000, and its removal, with all equipment and facilities, and the provision of new terminals, etc., will cost another $1,700,000.

Jones said the pipe line is expected to be in operation in approximately four months and that oil barges with necessary tugs will be made available from existing facilities, but that new barges also will be built. After removing the pipe line, he said, there will still remain ample pipe line facilities between Longview and Houston.

Meanwhile, first pipe for the "big-inch" line moved out of the mill July 9, according to reports to OPC, and 100 miles are scheduled to be delivered this month; 160 miles in August, 140 miles in September, 130 miles in October and the final 20 miles in November. Actual laying of the pipe will begin sometime this month, it was said.

War Emergency Pipe Line, Inc., which will construct and operate the $35,000,000 government-financed project, has set up headquarters in Little Rock, Arkansas, with B. E. Hull, vice president and general manager, in charge.

A full review of the OPC supply program which, if carried to a conclusion will increase the present overland movement to the East Coast of 954,000 barrels daily to a total, including an estimated 200,000 barrels by tanker, of 1,429,000 barrels by the end of the year, was submitted to the Senate commerce committee for consideration in connection with the Mansfield bill by J. R. Parten, director of transportation.

The year-end movement, Parten said, would produce a surplus of 62,000 barrels daily over the estimated minimum rationed demand requirements for this year of 1,367,000 barrels. However, he indicated, this surplus would be dissipated by the increase in demand expected next year in the prosecution of the war program.

In arriving at the above figures, Parten considered every proposal to improve eastern sihpments, including the "big inch" line from Longview to Salem, two lines across Florida, and several listed by Deputy Coordinator Davies as indefinite. Parten's report stated conversion and reversal of a 12-inch crude line from East Texas to Houston to supply a 12-inch line to be built from East Texas to Paducah, Kentucky, was scheduled for completion December 31, whereas Davies' reported this still under study. Likewise, Parten said a 10,000-barrel line from Fostoria, Ohio, to Akron, would be completed by September 30, while Davies stated that the filing of the product application for this system would depend on future developments in connection with studies of alternative methods for moving products eastward.

In addition a Gulf-Intercoastal waterway movement by wooden barge from Texas ports to Panama City, Florida, has been recommended, to deliver 50,000 barrels daily of residual fuel oil which would be trans-shipped by tank car to Norfolk and Jacksonville and intermediate points. This movement will require pipe-coiled wooden barges and related power equipment built new. The government agency which will have responsibility for providing this equipment has not yet been designated.

A steel barge movement of 35,000

barrels daily of clean products from Texas ports to Port St. Joe, Florida, by existing barge equipment to be assigned from other services, will supply the proposed trans-Florida pipe line, which is scheduled for completion by October 31.

The first group of projects, Parten said, will make available increased pipeline capacity to the East Coast district of 87,000 barrels daily, leaving the remainder of 123,000 barrels available for the shorter tank car, barge and lake tanker hauls, representing the equivalent saving of 3500 tank cars. The "big-inch" line will save 8800 cars.

"The tank car saving outlined," he warned, however, "would indicate the possibility of moving more oil from Illinois points than can be safely forecast because all authorities agree we cannot expect a sustained tank car movement into the East Coast area to exceed 800,000 barrels per day. It would, therefore, be hazardous to assume that by the rearranged program a net result should be expected as indicated directly by these figures. The several limiting factors upon tank-car movements must be expected to govern the railroad movements finally to be realized.

"It is important, however, that a large quantity of additional oil at Ohio River and Illinois points will greatly strengthen and insure movement to the East Coast by maximum use of all existing facilities, namely, Ohio River barges, railroad tank cars, pipe lines, and lake tankers."

OPC Pipe Line Relocation Projects

With announcement of WPB approval of the plan, Deputy Coordinator Davies made available a progress report of the various projects, as follows:

OPC Project 1: Increasing crude movement from Texas to Illinois and then East by 41,000 barrels daily, of which 25,000 barrels will be moved out of Illinois by pipe lines and 16,000 barrels by lake tankers and rail. Completion scheduled November 15.

All project items have received ratings and work is under way at various points. The project is in three parts and includes the following separate undertakings by the companies listed:

Undertakings

a. The Texas Pipe Line Company—Conversion and reversal of eight-inch crude oil line from Port Arthur to Dallas, Texas; installation of pump station at Waxahachie, Texas; laying 110 miles of 10¾- and 8⅝-inch lines between Dallas and Stuart, Oklahoma. Stanolind Pipe Line Company—Laying 54 miles of 12-inch line between Graford, Texas, and Healdton, Oklahoma; installation of pump station at Devol, Oklahoma.

b. Shell Pipe Line Company — Construction of 10-inch crossing under South Canadian River between McClain and Cleveland Counties, Oklahoma. Stanolind Pipe Line Company — Replacement of river crossing (four lines) under North Canadian River in Pottawatomie County, Oklahoma; construction of river crossing under Missouri River. Ajax Pipe Line Company—Laying 10 miles of 10-inch loop lines in Missouri. Texas-Empire Pipe Line Company—Installation of pumps and replacement of 11 miles of pipe on Valley Center, Kansas, line; installation of pump stations at Hiattville and Eureka, Kansas; installation of pump station at Centralia, Missouri; laying 32 miles of 12-inch line in Illinois. Stanolind Pipe Line Company—Installation of superchargers to increase pumping capacity between Kansas and Illinois.

c. Buckeye Pipe Line Company—Installation of pumps at Ellsworth, Mt. Cory and Warren, Ohio. Illinois Pipe Line Company—Laying 152 miles of 8-inch line across Ohio. Tuscarora Oil Company—Conversion and reversal of gasoline pipe line across Pennsylvania between Negley, Ohio, and Bayway, New Jersey. (The reversal has been accomplished already and the line will be converted to crude service as rapidly as possible.) Southern Pipe Line Company — Installation of pump stations at York, Pennsylvania, and Hancock, Maryland.

OPC Project 2: Increasing products movement through Plantation Pipe Line between Baton Rouge and Greensboro, North Carolina, by 30,000 barrels daily. Completion expected November 15.

Project rating obtained for installation of 14 intermediate pumping stations between Baton Rouge and Greensboro. Application expected to be submitted in a few days covering construction of 212 miles of 10¾-inch and 80 miles of 8-inch second-hand pipe from Beaumont, Texas, to Baton Rouge to supply approximate 60,000 barrels of products daily to Plantation line.

OPC Project 3: Increasing pipe-line delivery of products to East by 15,000 barrels daily.

Shell Oil Company has obtained project rating for pump station at Muncie, Indiana. Filing of project application for products pipe line from Fostoria to Akron, Ohio, depends on future developments in connection with studies of alternative methods of moving products eastward. Project rating obtained for reversal of Susquehanna pipe line between Cleveland, Ohio, and Twin Oaks, Pennsylvania.

OPC Project 4: Increasing products pipe line capacity in East by 32,000 barrels daily.

Sinclair Refining Company has obtained project rating for completion of products line between Marcus Hook, Pennsylvania, and Steubenville, Ohio. Line as originally planned by company was to have moved products westward, but will move 12,000 barrels of products a day received by barges and rail to East, instead. Keystone Pipe Line Company has completed reversal and conversion of present products line between Pittsburgh and Philadelphia and is delivering 20,000 barrels of crude daily now.

OPC Project 5: Increasing pipe line delivery of products to Mississippi River at Helana, Arkansas, by 55,000 barrels daily, for shipment up the Mississippi and Ohio Rivers by barge to Pittsburgh. To be finished November 1.

OPC has approved the project application of Gulf Refining Company for reversal and conversion of present crude oil line to transport products from Port Arthur, Texas, to El Dorado, Arkansas. Applications expected soon from: The Texas Pipe Line Company for construction of 15-mile extension of its system from Bossier City, to Benton, Louisiana, to connect with Magnolia pipe line system at Benton Junction, Louisiana, using 8-inch pipe reclaimed from existing lines, and for reversal of Magnolia crude oil line between Benton Junction and El Dorado; and Project Five Pipe Line Company for construction of 158-mile products line from El Dorado to Helena, using 10¾-inch pipe reclaimed from existing lines. Project rating obtained for Humble Pipe Line Company covering installation of complete pump station at Alanreed and Rule, Texas, to handle crude now moving through Gulf-Magnolia line from Panhandle to Ranger, Texas, which is now being taken up.

OPC has approved plans for a sixth project: Construction of an 8-inch products line across northern Florida, using second-hand pipe excavated in Texas, which will provide additional facilities for the southeast to the extent of 35,000 barrels; and a seventh project is still under study, for increasing movement of products from Longview, Texas, to near Paducah, Kentucky, and then East by 60,000 or more barrels daily.

New and Used Pipe Stocks Near a Million Tons

However, types and condition of material reported in OPC inventory study preclude estimates of usable tonnage — Figures may be used to "pool" supplies

By B. F. LINZ, Washington Correspondent

A RESERVOIR of several hundred thousand tons of oil field tubular material which may form a "pool" from which members of the industry in need of such equipment may draw by purchase or exchange, has been uncovered by William F. Huff, director of the OPC materials division, in an inventory study now nearing completion.

Already, Huff said, advantage has been taken of the study to secure urgently needed materials for War Department, lend-lease and other projects, and impressive possibilities are seen for the reclamation and further use of materials which in normal times would be considered obsolete or unserviceable.

The study, to which more than 180 of some 250 concerns canvassed contributed information, developed approximately 713,000 tons, representing some 114,500,000 feet, of "practically everything ever pierced or rolled," it was said. Of these totals, approximately 472,000 tons or 75,000,000 feet was new and 241,000 tons or nearly 40,000,000 feet used material.

Based on the inventories reported it is estimated that the 70 companies not yet heard from would hold sufficient stocks to raise the total to near a million tons. This would still leave a sizeable stockpile untouched by the OPC survey in the hands of companies and operators not included in the 250 concerns canvassed.

The figures showed that the proportions of new and used line pipe practically matched, while there was about four times as much new casing as used, three times as much new tubing as used, but six times as much used drill pipe as new.

Huff stressed, however, that the figures, in themselves, do not reveal the true inventory situation. Included in the totals, he said, are some unknown quantities of material which is too pitted or otherwise deteriorated to be serviceable; the usefulness of other material will depend upon its size and the possibilities of matching odd sizes. Accordingly, he emphasized, it is not possible to proceed on the assumption that the amounts of material listed in the inventory represent so many months' tonnage for the industry.

Accompanying the inventory, figures were secured on first quarter receipts and consumption which showed that the two nearly balanced—196,000 tons or 34,900,000 feet received and 180,000 tons or 34,700,000 feet used—indicating that the inventories reported were built up in previous periods and that there has been no hoarding since restrictive orders were imposed by WPB. Those figures, Huff said, indicate that in 1942, considering M-68 and everything else, the amount of pipe secured just about takes care of the industry's needs.

The study is being made by OPC with a view to developing how much material is held by operators which they can release to others who need it. It is not intended to exercise any compulsion upon companies to dispose of material which they do not need immediately—in fact, OPC has no such authority—but the thought was that the operators would uncover material they had forgotten they owned and many, especially the smaller ones, would be glad of an opportunity to turn excess inventories into cash or to trade what they did not need for something they must have.

In the course of the inquiry, it was found that many operators were discovering that a little rehabilitation work would make usable badly needed material which it is now difficult to procure —valves, among other things—and pipe which could be made to do in the place of pipe they did not have. At the same time, large quantities of material were brought to light which were found to be useless for further service but which will make a valuable contribution to the scrap pile. These things, Huff said, will go far to offset the expense which the companies undeniably incurred in making the inventory.

He foresaw also that the effort to make use of reclaimable material in the interests of economy will provide work for the thousands of little "job shops" in the oil country which, too small to get into any form of war production, have been having hard sledding.

Furthermore, he suggested, by using or disposing now of the material on hand, the industry will be in position after the war to take advantage of changes in specifications, design, etc., which are expected to develop.

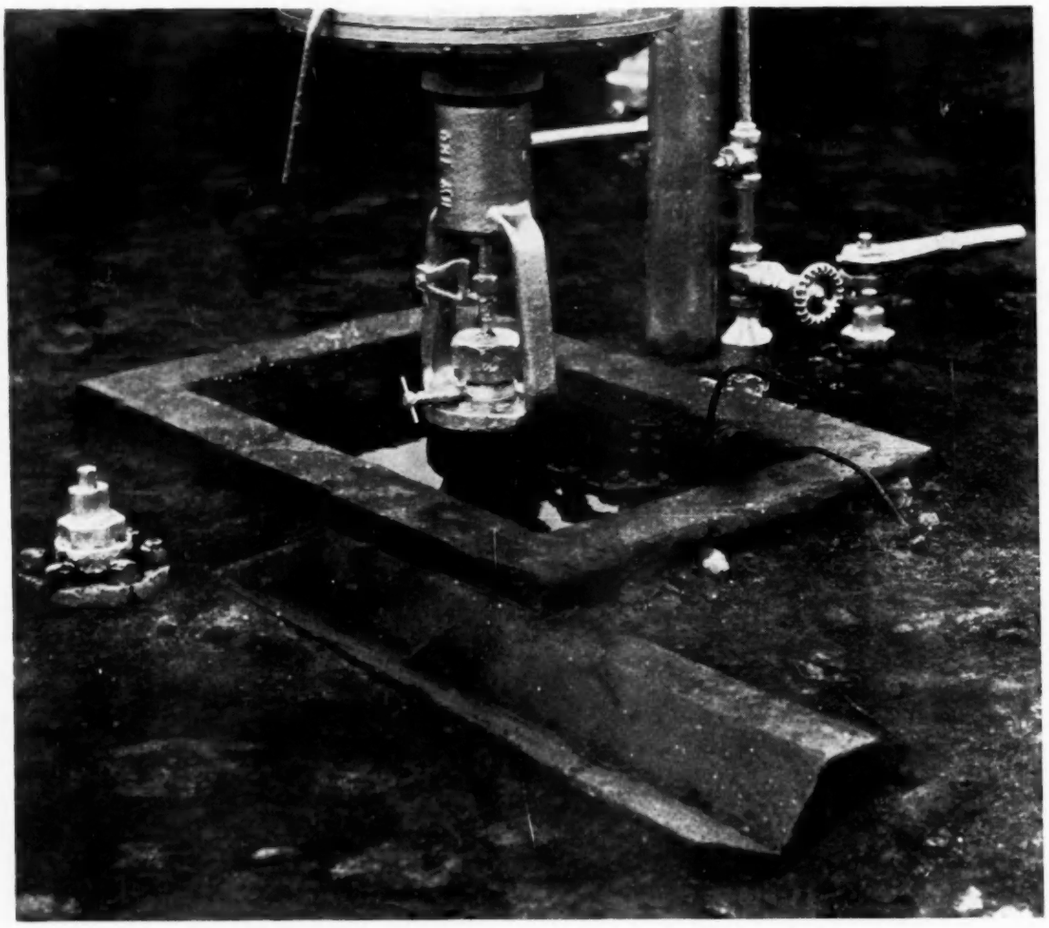
A further factor is that the current studies will leave the industry in better shape to meet new restrictions and controls which it is foreseen will have to be imposed as the war continues.

Bureau of Mines Will Produce More Helium

Under a new program of the Bureau of Mines, helium gas will be produced in greatly enlarged quantities from the bureau's expanded helium plant in Texas in order to meet war requirements. Also, a new helium production plant at an undisclosed location will be supplied with helium-bearing natural gas from an existing pipe line transporting gas for fuel purposes.

An appropriation of $4,000,000 to become available from Navy Department funds will enable the bureau to carry out expansion of its helium production program. Engineers and geologists of the bureau are studying gas fields for the purpose of establishing new helium reserves.

In 1920 the bureau built the present plant near Amarillo, where a gas field of 50,000 acres was taken under government control. During 12 years this field produced over 100,000,000 cubic feet of helium, but until the last year the bureau did not operate the plant at full capacity.



Vat made of fire brick lined with mortar is situated in shallow pit filled with water. Large pipe passing underneath is fed by flame, heating water. Parts of regulators set in water are kept warm, preventing freezing after flow restrictions of high pressure gas. Small nipple extending through wall of vat furnishes overflow. Its construction allows regulating water level in vat.

Water Heater System Prevents Freezing of Regulator Valves

By GORDON B. NICHOLSON, Staff Writer

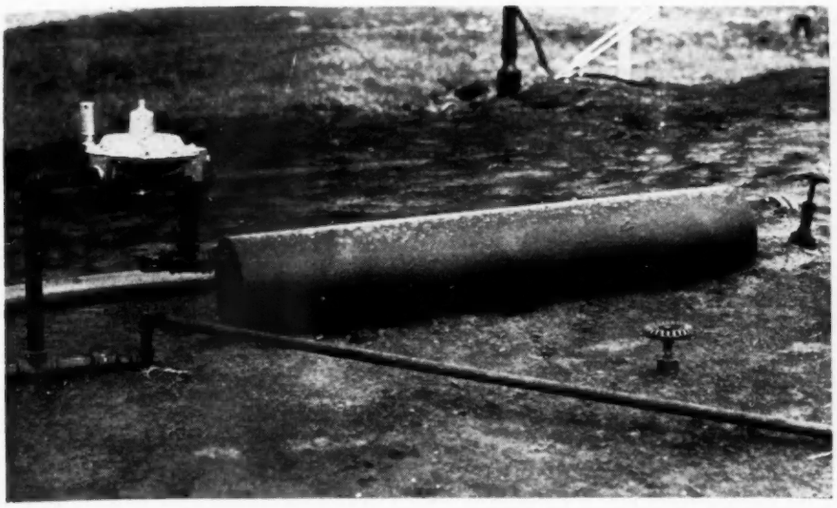
To prevent freezing of valves, orifice, or other units of regulator on a gas well in the Placedo field, Victoria County, Texas, Westgate Greenland Oil Company uses a special heater in which parts of the regulator prone to freeze are kept submerged in a vat filled with hot water, with heating element consisting of an inexpensively constructed underground pipe fed by a flame regulated by a pilot light and using gas from the separator.

Gas produced from the well provides lifting power for several other company-owned wells in the field which are operating on gas lift. Line pressures at the gas well are reduced by regulator to the desired pressure for lifting, then gas is distributed to various oil wells.

Freezing of orifices and chokes by passage of high-pressure gas caused frequent difficulty in operation, and to forestall production failures, operators devised the heating system to raise the temperature of the gas as it passes through the orifice, preventing severe drop in temperature with resultant freezing.

Important element of the heater consists of a vat 13 inches deep and 24 x 36 inches in lateral dimensions, set in a shallow pit. Constructed of firebrick and lined with mortar, the vat is water-tight and filled with water at all times. Regulator sets in the hot water, with the orifice and parts of the regulator body under the surface, and freezing on downstream side of the orifice is prevented.

Water in vat is maintained at proper level by an overflow consisting of a ¼-inch pipe extending through the wall of the vat an inch below top, opening into a concrete drain set at a slight angle in the ground. On end of the ¼-inch nipple, fittings are connected for at-



Volume tank collects gas from separator after passage through pilot regulator, assuring constant feed and steady pressure for burners. Freezing of pilot regulator is also averted by its location in heating vat, with orifice and regulator body submerged in hot water.

taching another nipple about 1 inch long, arranged in swing-fashion to stand vertically, or to be adjusted to any desired level not exceeding top of the vat. Height of this pipe determines level of the fluid inside the vat, with excessive water overflowing automatically through the drain, and following the ditch to a shallow excavation or gathering pit, where it is later picked up and returned to a storage drum. Water requirements are low as little waste occurs, temperature of the water seldom attaining point where evaporation is acute.

The water is heated by an oven made of a joint of 4-inch pipe 20 feet long. The pipe is buried a few inches for insulation, and passes through the water vat. Into a chimney one foot from the fire end of the pipe, a ½-inch gas line is directed, blowing gas into the oven. When ignited, flame and hot air pass through the large pipe, warming water contained in the vat.

Lower end of the pipe is equipped with a transparent door through which workers ascertain at a glance presence and nature of the flame in the oven. The door is made of pressure-gauge glass, held in place by means of a flexible bracing made of welding rod material. At the opposite end of the oven, a 4-inch tee is placed, and the 4-inch oven pipe is swaged to permit erecting a 2-inch stack to stand vertically about 6 feet. Tee is provided with a bull plug inserted in its end, removal of which provides means of swabbing to clean oven.

Gas for the oven is obtained from the separator, and a regulator is used on the separator line to correct pressure admitted to the pilot line. The pilot line regulator also sets in the heating vat, preventing freezing in its parts and reducing variations in pressure of gas fed to the burners.

To assure proper feeding of pilot gas into the oven, a volume tank is provided. Gas coming from the separator through a 5/16-inch line, after passing through the heated pilot regulator, by means of a continuation of the 5/16-inch line enters the volume tank, which is constructed of a joint of 7-inch pipe cut to an 8-foot length and sealed at both ends. From the volume tank, a ½-inch line takes gas to the burners. Tank assures constant feeding of gas to the oven, preventing variation in volume and temperature.

A steel drum is stationed near the vat, and contains water for supplying the heating system. A ¼-inch nipple serves as outlet, located near the bottom of the drum, and a ¼-inch copper line with a stop cock on the open end extends to the pit. At intervals as needed, the valve is opened for replenishing supply of water in the vat.

Oven is buried under several inches of soil for insulation. Gas is directed into lower end through ½-inch line, while flame is observed through transparent door in end of oven, made of pressure-gauge glass. Drum contains additional water for filling vat.

Review of Ultimate Recovery Factors And Methods of Estimating

By S. F. SHAW, Consulting Engineer

IT WAS recognized at least as far back as 1887 that recovery of oil from the reservoirs of many fields was not high, but studies of this subject had not reached the point where any very definite idea existed as to the quantity actually contained in the reservoir and, therefore, what was the actual recovery. In 1887, Ashburner[1] commented on the recovery of oil from the Venango district, Pennsylvania, as follows:

"From my own estimates, I have determined that the oil-producing sand in the Venango district, up to the present time, has only produced an average of 900,000 barrels of oil per square mile (1400 barrels per acre). It is impossible to determine the absolute thickness of the reservoir sand over any definite area, even as small as one square mile. There are so many variable factors which enter into the problem that it is difficult to arrive at any fair conclusion on the question of relative porosity. From estimates which have been made of the producing capacity of the oil and gas sands of the different Pennsylvania and New York districts, I believe that the amount of oil which will be ultimately retained, by capillary attraction, in the pores of the sand beds will range from eight to nine times as much as the total amount of oil which it will be possible to extract from these sands through wells."

The reservoir sands in the Venango district have a low degree of porosity, permeability was of low order, and owing to the shallow position of the sand, the reservoir pressure was low and the gas content of the oil was low. Under such conditions, judging from the present state of knowledge, only low recovery percentages could be expected from primary methods. Many of the fields in the Appalachian area were of this character, and in these early days low recovery was to be expected, but such recoveries can not be taken as representative of the recovery percentages that would be obtained from reservoirs with high porosity, high permeability, and under higher pressures.

In the course of time it became evident that it was desirable to make some estimate of the actual oil contents in the sand, whether exact or not, and to determine approximately the percentage of recovery that was being obtained, otherwise the extraction of oil would remain a most hazardous enterprise.

In 1915, nearly 30 years after the comments by Ashburner, Washburne stated[2] that "at present it is impossible to estimate closely the amount of oil obtainable from a given area of land. However, after the completion of a few properly distributed prospect wells, one can calculate the approximate yield of the sands penetrated, with a probable error of say 50 percent. Even rough predictions of this kind are of value in large operations. . . . The porosity of the stratum is the measure of its maximum reservoir capacity for liquids and gases. The porosity may be determined experimentally and must be used in connection with the total volume of the sand."

It is apparent that as of 1915, or perhaps earlier, porosity was recognized as a measure of total contents, but investigations had not reached the point where attempts could be made to distinguish free gas from gas in solution, nor could the shrinkage factor be determined; also at this time, there was no knowledge available as to connate water content, nor was it easy to determine the gas-oil and oil-water contacts.

In 1917, Pack stated[3]: . . . "any attempt to estimate the quantity of some mineral in the ground appears to enter the realm of imagination, and it seems that the estimate can be nothing more than a blind guess. It may appear to be especially futile to attempt to determine the quantity of oil and gas that is available in the ground for these minerals are so vagrant that even if the quantity now available should be known quite exactly the quantity that will eventually be obtained may be much less, for certain losses in the extraction of both oil and gas are unavoidable and just what these losses will be cannot be predicted. . . . In a great many areas, however, and of these California fields are fairly typical, the formations are so lenticular and the reservoir sands so inconstant both in thickness and lithology that no reliance can be placed on the calculations of the volume of the reservoir made in this manner, even if the points at which measurements were made lie fairly close together."

As of 1917 Pack recognized that only a portion of the oil content in the reservoir was recovered, but data on recovery had not reached the point of furnishing a recovery factor for different classes of reservoirs, and to this day the recovery factor is a rather nebulous affair.

In 1917 Lewis stated[4]: "Opinions on the amount of oil left underground have ranged from 25 to 90 percent, the commonest estimates being about 50 percent. Precise data have never been submitted with any of the estimates, they being frankly generalities based on the judgments and experiences of the estimators. Some of the estimates are as follows: White, 25 percent for the oil sands of West Virginia; Arnold and Garfias, 40 to 60 percent for the oil sands of California; Ashburner, 90 percent for the oil sands of Pennsylvania; Dunn, 25 to 85 percent; Narramore, 90 percent; Washburne, 36 to 60 percent. . . . Mc-

Laughlin states that the recovery from the Kern River field in California, has been approximately 26,000 barrels per acre to 1915. As the field has been producing for 14 years, and is nearly drilled up, an optimistic estimate of the future production would make a total recovery of not more than 40,000 barrels per acre, or enough to saturate about 20 feet of sand, whereas a thickness of 200 to 300 feet is reported in that field. McLaughlin also reports actual recoveries from a number of properties in the Midway and Coalinga fields, California, from which the following tabulations are made:

	Coalinga	Midway
Number of properties	13	18
Average age of wells, years	6	4
Average thickness of oil sand, ft.	96	90
Average prod. per acre, bbls.	22,012	13,579
Avg. prod. per acre-foot, bbls.	222.5	151
Avg. recovery, percent	11.5	7.8
Min. prod. per are-foot, bbls.	26.5	51
Max. prod. per are-foot, bbls.	838	742

"These properties are still producing but have yielded at least two-thirds of their total production. The figures show that the recovery will not average more than 15 to 20 percent of the assumed porosity of 25 percent."

Actual per-acre recoveries to the end of 1941 were, for Kern River 83,000 barrels, for Coalinga 21,730 barrels, and for Midway - Sunset, 28,030 barrels, based on figures taken from A.I.M.E. Pet. Dev. & Tech. for 1941, and these fields after a further 25 years of productive life are still capable of producing a considerably greater quantity of oil.

Lewis lists various recovery factors as stated by various authorities supposed to apply, but lack of data prevented stating the character and porosity of the reservoir rock and factors such as permeability and reservoir pressure, therefore, these recovery factors are reflections only of the opinions as of 1917 and do not indicate the factors that have later been shown to more nearly apply. Any one using these old factors to make comparisons with present-day recoveries does not have a clear conception of conditions that were supposed to exist in 1917, and which in most cases have had to be revised.

In 1919, Beal[7] gives recoveries from some California fields as of 1917, to which are added the corresponding figures for 1941, which are noted in an accompanying table.

Per-Acre Recoveries in California Fields in 1917 and 1941

FIELD	1917 Proved Acreage	1917 Barrels Recovered Total	1917 Barrels Recovered Per Acre	1941 Proved* Acreage	1941 Barrels Recovered Total	1941 Barrels Recovered Per Acre
Midway-Sunset	40,204	291,822,154	7,259	32,480	618,189,802	19,030
Kern River	7,732	198,645,210	25,698	6,100	275,944,787	45,230
Coalinga	14,771	196,872,731	13,328	18,070	363,191,705	20,100
Whittier-Fullerton	4,575	115,584,105	25,264	.....	.....	.....
McKittrick	1,635	52,114,761	31,874	1,525	90,970,410	59,650
Lost Hills-Belridge	4,476	28,426,055	6,351	6,737	112,609,647	16,720
Ventura Co.-Newhall	4,514	19,924,745	4,414	4,690	65,064,425	13,880

* From Pet. Dev. & Tech. Vol. 142, p. 264.

Close comparisons should not be made of the figures in the tables for acreage in 1917 and 1941, because of the changes in acreage assigned to the individual fields. It is evident, however, that the estimates of ultimate recovery made in 1917 were much lower than has already been obtained.

In 1918, Lewis and Beal[5] discuss factors that control estimation of future production and discuss three methods then coming into use for estimating reserves. In 1919, Beal[7] again mentions the use of these three methods for estimating reserves.

In 1918, Requa[6] describes the work that was done in California in estimating reserves in various fields of that state. Methods of estimating reserves in various fields were discussed by Requa and by Lewis and Beal[5] and results of investigations in these fields carried on over a period of some years were published by Beal[7] in 1919. Beal states:

"Lewis gives other methods of estimating the recovery factor as well as estimates made by various persons of the amount of oil left underground, these ranging from 25 to 90 percent; he also presents statistics that lead him to believe that only 10 to 20 percent of the oil is ordinarily recovered. This is much lower than the usual estimate of approximately 50 percent."

In the light of a better, but still imperfect, knowledge, this recovery range of 10 to 20 percent mentioned by Beal should be understood as applying for the most part to tight sands of low porosity found at comparatively shallow depths.

The question arises at this time as to how far we have progressed since these important papers and bulletins were written. Much experience has been gained in the meantime; the limitations of the methods employed for estimating reserves are better known; many of the suggested figures for ultimate recovery are changed in the light of later information; and yet we seem to be struggling with factors that are still unknown, and even when some of the conditions are known it seems difficult to apply definite values to the factors that enable an exact application of them to be made. True, we are making estimates, sometimes with the air of exactness that would convey the impression that all of these matters have been solved. We have made considerable progress in determining some of the details, but this should not allow us to lose sight of the overall results yet to be obtained. We have only to compare the production that is actually recovered from wells with the estimates made of the recoverable oil in the early history of these same wells to see that too high a degree of exactness in making estimates is not justified.

Costs of drilling and production, and price of oil have a decided, perhaps the most important, bearing on the recovery of oil. If it is believed that the cost of drilling will not be repaid, then drilling will not be undertaken until a more propitious time. After the drilling is completed, production will continue as long as a profit can be made over operating costs regardless of the previous expenditures for drilling, but when production costs exceed the revenue to be gained, then production will cease in most cases and the remaining contents will be lost unless, or until, the conditions become such that the operation can be resumed at a profit.

Methods Employed for Estimating Reserves

There are five methods employed for estimating ultimate recovery:

1. Arbitrary estimates of barrels per acre, or barrels per acre-foot, based upon recovery from fields with supposedly similar conditions.
2. Estimates based upon volumetric, or saturation, contents of the reservoir.
3. Estimates based upon decline

curves constructed by plotting production against elapsed time.

4. Estimates based upon the initial production of the well produced at maximum capacity for one day, or upon the average daily production of the first year multiplied by a factor.

5. Estimates based upon plotting the decline of reservoir pressure against the accumulated production.

The first-mentioned method is being employed by many geologists and engineers where other methods are impracticable or where factors for making detailed analysis are lacking. Despite the necessity for covering many conditions with a single factor, this method sometimes serves the purpose better than any of the other methods, since it is based supposedly upon several years of experience in the use of the method. It is understood, however, to be a guess, presumably an intelligent guess, and both the estimator and the one for whom the estimate is made should understand that it is a guess. This method depends upon assuming that the field has characteristics similar to those of other fields wholly or largely depleted, in which the recovery is known. Estimates range from a few hundred barrels per acre-foot to over 2500 barrels per acre-foot. An instance of low recovery is noted at Bradford where recovery to the end of 1917 was 60 barrels per acre-foot. We have learned that with low porosity, and tight sand of the character concerning which Ashburner wrote in 1917, it is impossible to recover a high percentage with primary methods. Instances of high recovery are mentioned by Swindell[19] where the recoveries to the end of 1941 from two large leases in the Seminole field, Oklahoma, were 2793 barrels and 2291 barrels respectively per acre-foot of penetration, and these two leases are still producing important quantities of oil. In 1930 the writer called the attention of various engineers and geologists to the apparently high recovery that had been made in the Seminole field up to that time, but these engineers in commenting on the figurs seemed to think that there must be some error in them. Swindell's figures[19] at a much later date indicate that conditions were such as to allow a very high recovery to be made here as compared with the recovery in the Venango sand in Pennsylvania or the Bartlesville sand in Oklahoma.

In 1917, Lewis[4] stated that capacities per acre in three general areas of the United States were estimated as follows:

	Estimated Porosity Percent	Capacity Per Acre-foot
Appalachian fields	12.5	970
Illinois and Mid-Continent	17.5	1,358
California fields	25.0	1,940

The porosity of sands in the Mid-Continent in 1917 at 17.5 percent was low, but a large part of the sands here was the Bartlesville sand. Porosities of sands found in Oklahoma since 1917 are considerably higher than those of sands known in 1917.

In 1915, Day estimated the recovery from Appalachian fields to be less than 800 barrels to the acre. At Bradford the recovery to 1917 was about 2700 barrels per acre for 45 feet of sand, or 60 barrels per acre-foot, which however, has been much increased since that time by the use of air-drive and water-flooding.

Deussen[18] refers to acre-foot production in fields along the Gulf Coast, and gives a table prepared by L. P. Teas on some fields, which is given herewith.

Yield Per Acre-Foot in Texas Gulf Oil Fields. (Teas)

FIELD	Acre-foot Yield
Barber's Hill	1,037
Big Creek	1,616
Goose Creek	1,778
Hull	1,654
North Dayton	1,188
Orange	2,599
Pierce Junction	1,956
South Liberty	1,537
Spindletop	7,446
West Columbia	1,159

Deussen is of the opinion that the yields cited by Teas are not on basis of the total thickness of the sand section, and states that up to 1930 his investigations in the Goose Creek field indicated a yield of 477 barrels per acre-foot, and 767 barrels in the Orange field. To the end of 1941, the yields per acre from these two fields were 80,400 barrels and 80,000 barrels respectively.

A figure that is used in this method of estimation as often, perhaps, as any other figure is 750 barrels per acre-foot. For some situations it is surprising how close this figure suits the purpose for general approximations. Naturally such a figure depends upon the contents of oil in the sand, that is upon the porosity, and also it will vary greatly upon whether the sand is tight or open, that is, upon permeability. For instance, Bartlesville-sand pools in various parts of Oklahoma and Kansas do not approach the recovery per acre-foot that is obtained from Wilcox-sand pools, even though porosity may not be so greatly different as the recoveries would appear to indicate.

In older pools where no reliable data are available on sand thicknesses, the only figures that have any meaning are those of per-acre yields, and many references will need to be made on this basis in comparative tables of various fields.

Care must be taken, of course, in applying an arbitrary figure for per-acre recovery, as has been observed recently by the writer in instances of some fields in South Texas where it now appears that recovery will not reach half that based either upon an arbitrary guess per acre-foot, or upon laboratory methods of calculation, one reason being the encroachment of large quantities of water, another reason being the cost of lifting the water.

Volumetric, or Saturation, Method

The volumetric method depends essentially upon the estimation of the total contents of oil in the reservoir, to which is applied a factor for arriving at the total recovery. Several factors enter into the estimation of contents, also into the factor for recovery percentage, and before this method reaches the stage where it can be employed with any degree of dependability, it seems likely that other factors possibly not now recognized may have to be introduced into the computations.

Some of the factors that must be ascertained for determining the contents of oil originally in the reservoir are porosity, thickness of the producing formation, gas-oil contact, oil-water contact, gas content of the oil and connate water content.

In 1930, Coleman, Wilde and Moore[12] presented a paper in which formulas were set up which can be employed to establish the contents of a reservoir by noting the initial and subsequent conditions of reservoir pressure and gas content of the oil. In 1936, Katz[14] proposed a method for estimating the contents of a reservoir which

he termed the "material balance" method, which can be employed where there is no large or irregular intrusion of water into the producing formation or where the oil is not undersaturated with gas. This method in principle is similar to the Coleman method. The material balance method does not depend upon the area, thickness or porosity of the reservoir, but upon the quantitative effect of withdrawals of oil and gas from the reservoir and upon the status of reservoir pressure, careful measurements of which must be made initially and at subsequent periods, in order to apply the method.

Factors affecting percentage of actual recovery are numerous, many of which are unknown as of a given time, or the importance of which are unrecognized. They include reservoir pressure, permeability, viscosity, percentage of gas in the oil, method of production, rate of production, degree of depletion, price for oil, cost of production, and perhaps several other important factors. Some of these factors are dependent upon each other, such as rate of production being dependent upon the method of production; degree of depletion being dependent upon cost of production, rate of production and size of casing; cost of production being dependent upon rate of production and upon the method of production. From inspection of this list of factors it can be surmised how blind as yet is the guess that may be employed to arrive at a single embrasive figure for recovery percentage, and to apply this factor to the life of the field. Of course, assumptions or guesses can be made but such factors should not be surrounded by the halo that is sometimes attached to values for these factors that are carried out into the decimal places.

In fields already depleted, many of the factors that apply to underground conditions were not observed when those fields were discovered, therefore, such factors based upon performances in past history are lacking. It must be recognized that the application of definite figures are merely guesses and made now with as good judgment as possible, but all of them subject to correction when the times arrives that these fields now largely restricted, are depleted and the assumed factors can be compared with the figures actually obtained.

Washburne[2] refers to a factor of extraction ranging from 60 to about 80 percent.

Lewis[5] states in regard to the volumetric method "the value of the recovery factor is controlled by all the variables involved in the production of an area, a condition which makes the assignment of an arbitrary value for the specific property hazardous."

Pack states[3]: "Even under the most favorable conditions, then, the saturation method is capable of giving only a rough approximation of the recoverable oil in any area, but rough as it is, this method has a distinct value for it will give directly a first approximation of the maximum amount of oil to be expected from an untested or very sparsely drilled area in which the formations are fairly constant in thickness and lithology . . . This method is not, however, applicable to areas where oil is held in solution cavities or in fracture zones, nor is it of any very great value in the consideration of pools that occur in the variable Tertiary strata of California."

Beal mentions[7] difficulties in using the saturation method as follows: "The disadvantages of the method may be summed up as follows: (1) Impossibility of obtaining information as to the exact thickness of the pay; (2) difficulty in accurately determining the voidage because of differences in porosity; (3) practical impossibility of determining the percentage of oil recovered from the sand, as proportion varies with temperature, pressure, character of the oil, character of the sand, relation of edge-water to oil, encroachment of water, the space in the reservoir occupied by gas, and the underground migration of oil. The author believe sthat the value of the saturation method has been overestimated, and is not willing to concede that it can be applied under ordinary circumstances, without the making of hazardous assumptions."

In discussing the argument by Beal & Lewis, E. W. Shaw states[5]: "The so-called saturation or porespace method of estimating unrecovered oil is not, it seems to me, of such small value as Lewis and Beal and others believe. I have used it with satisfactory results in a number of fields, and believe that, with recognition of its limitations, it has a good deal of value, particularly where standard tools are used, and fairly accurate information can be gained concerning not only the thickness and lateral extent of the pay, but water and 'dry' streaks in the pay, sizes or pores, and also methods of recovery. Where, because of lack of recorded data, or for any other reason, other methods are inapplicable, the pore-space method commonly gives results that, I believe, are far better than none at all, and elsewhere it can be used as a valuable side light, corroborating or throwing doubt, as the case may be."

At a more recent date Jarvis states[16]: "These recovery factors can be estimated in a number of ways. We believe this estimation of recovery factor is the weakest point in estimating reserves by volumetric methods."

In discussing the factor for viscosity, Washburne[2] states: "At the temperatures prevailing at depths of 2000 m. light oils have approximately the same viscosity as water, some even less, so that viscosity cannot be an important factor in the concentration and segregation of such oil on its original migration." In this connection, E. W. Shaw states[2]: "As to the relative viscosity of oil and water, it seems probable that the difference, particularly in deeply buried sands is not important, because the temperature is higher and the viscosity is lower than at the surface. The difference in viscosity between warm oil and cold oil is greater than that between the average oil and water at ordinary temperatures."

In experiments of flowing characteristics through a sand, Uren and students[17] demonstrated that the flow of warm or hot oil was much greater in a given period and under a given pressure than cooler oil. It has also been shown that the flow or hot, dead oil, is much greater than oil saturated with gas.

Already some of the fields discovered within the past 10 years with thin sands have reached the point, even under restricted production, where comparison of probable ultimate recovery can be made with the estimates based upon the volumetric method, and some of these comparisons show woeful discrepancies. For the most part, those based upon the volumetric method examined by the writer seem to show a considerably lower probable ultimate recovery than the original estimates called for. This is unfortunate for the operator who drilled the wells

upon certain assumptions of outcome.

One field studied by the writer which was opened within the past 10 years with fairly wide spacing and operated by a single company, has reached the point where the present estimates are now down to one fourth those of the original estimate. In another field with closer spacing, it now appears as if recovery will be one half or, less that of the estimates made by a well-known firm of valuation engineers.

These instances are not mentioned to indicate any incompetency on the part of the geologists and engineers making the estimates, but rather to indicate the difficulties attendant upon making estimates in fields where highly restricted production practices prevail, and where resort must be made to the uncertainties of the volumetric method with its unknown, unevaluated and misunderstood factors for making these ultimate recovery estimates.

In another field in which an early estimate was made by the writer, using the volumetric method, and where spacing was 40 acres per well, it now appears as if the ultimate recovery will be only about 50 percent of the early estimate. It seems to the writer that the spacing of one well to 40 acres will have reduced the recovery to about half that which could have been obtained with 10-acre spacing.

Decline-Curve Method of Estimating Reserves

The decline-curve method consists in plotting production against elapsed time, or in plotting the percentage of production of a given year, compared with that of the first year. This is done on logarithmic paper, on semi-log paper, or on regular cross-section paper. The mathematics of these curves is discussed by Larkey[9] and Roeser[11]. Record of the earliest use of logarithmic paper available to the writer is the mention by Lewis and Beal[5] in 1918, and a definitely practical use of this method in various fields was established by Beal[7] and Cutler[10].

The value of a decline curve for estimating ultimate recovery depends upon the accuracy with which these curves can be extrapolated, which practically eliminates the use of cross-section paper.

Accurate use of any decline curve depends upon producing a well at maximum daily capacity, but as long as wells are restricted by proration schedules, this method is not applicable. Some semblance to a decline curve can be obtained at periods of perhaps six months or a year, even when operating on restricted schedules, by opening the well up to a maximum capacity for at least several hours, or sufficiently long for the well to establish a dependable maximum rate, which rate is then plotted against the elapsed time. The graph so constructed would have to be employed with caution to avoid arriving at misleading conclusions. In describing the use of cross-section decline curves, Pack[3] points to the necessity of using discrimination when employing the method.

A production-decline curve on a given well producing at maximum capacity is fairly dependable as long as there is no change in the production method of the well itself, or no change in the production methods of surrounding wells. A change in production method may established a marked change in the slope of the decline curve. Changes in lifting methods on a well may reveal the fact that a former rate was not that of maximum capacity, or it may result in a well operating at a lower rate than formerly, and this reflects itself in a change of the slope of the line on the graph.

The writer prefers the use of log-log paper for plotting decline curves of production against time, since they appear to approach more closely a straight line than any other type of curve, and give direct results in indicating the maximum capacity as of a given time.

Decline curves not only permit ultimate-recovery calculations to be made, but also provide a basis for determining the daily or monthly rates at which wells can produce throughout their productive life, which is, of course, impossible with either the comparison method or the volumetric method of making ultimate recovery estimates.

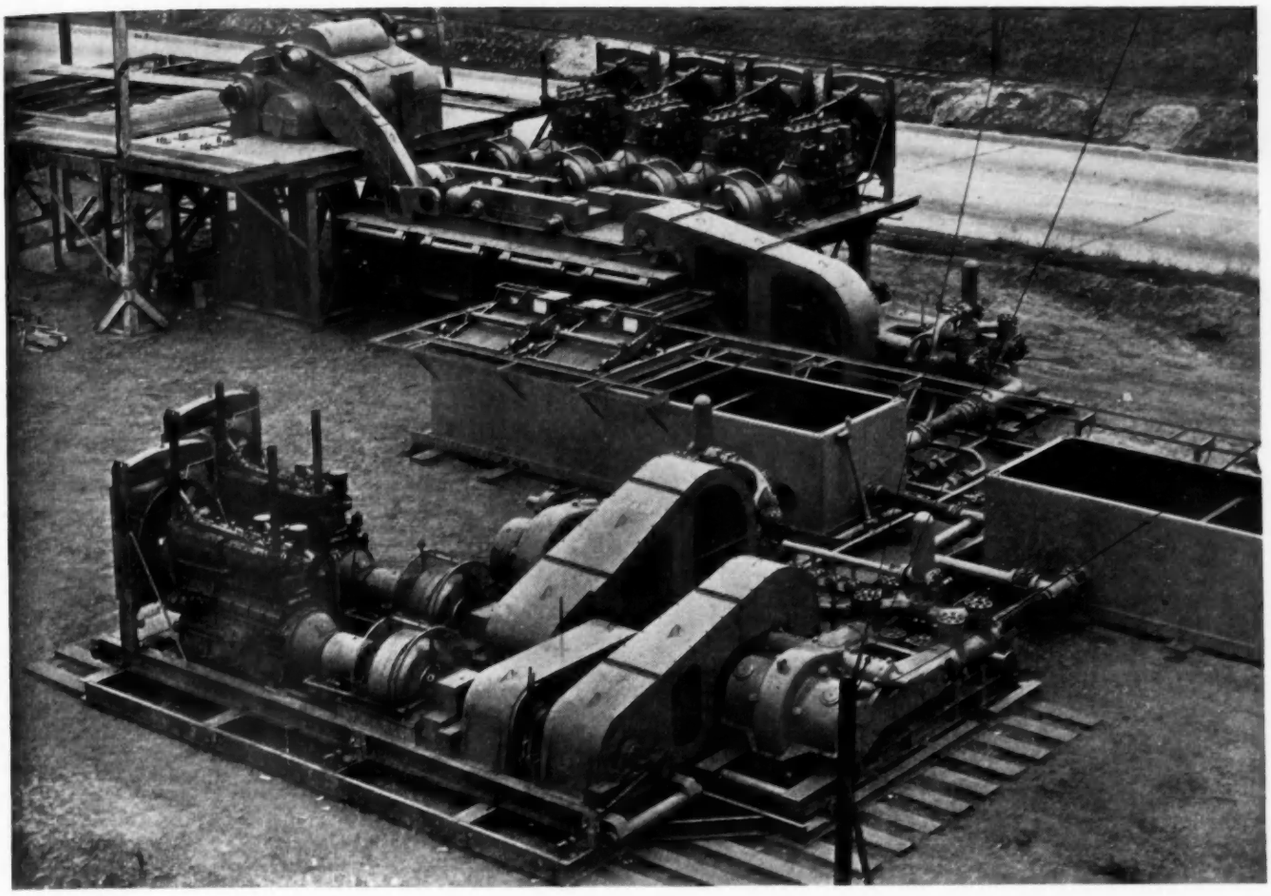
Lewis[5] states: "The second method (decline curve) is based on the record of production of the wells themselves. As the past production of a well is an index of this quantity of recoverable oil rather than of the total content, a determination of the relative proportion of the recoverable oil is unnecessary . . . Experience has shown that the production-curve method to be the most satisfactory so far developed and this method, with various modifications, is consequently in most general use."

Larkey[9] states that the semi-logarithmic type of curve, $y = kr^x$, was found to be more suitable for Burbank, and the logarithmic type, $y = kx^n$, was more suitable for Tulsa County.

Decline curves assume a tendency toward a flattening (change in the slope) in the later life of a well even on log-log paper, perhaps, because of the gradual introduction of better methods, and the use of secondary recovery methods. Such a change in the slope of the curve, of course, indicates improvement in the percentage of recovery. Volumetric methods of estimating ultimate recovery cannot easily reveal the effect of changes brought about by improved methods, therefore, cannot show the effect on recovery percentages effected by such methods, nor can they show the subsequent modifications of estimates that should be made after having gained a better understanding of the performance of the reservoir over a given period.

Decline curves reveal the effect of well spacing, and of interference of other wells. Thy can be misapplied or misinterpreted, however, particularly when it is desired to show by comparison the supposed effect of some new method.

These curves in the early stage of a particular well, after it has reached the peak of production, can be employed fairly satisfactorily, but when applied to the field as a whole may be misleading until the field has been practically drilled up, or is being drilled up at a regular rate, and wells have settled down to a steady rate of decline. It is not at all difficult for considerable differences in interpretation to arise in plotting decline curves if this is attempted before the wells have settled down to a steady rate of decline. This is illustrated in Figure 1 by comparing a decline curve[23] designated as No. 1 constructed for the Oklahoma City Wilcox sand as of 1940 with one constructed in 1941 and designated as No. 2. It will be seen that these curves cross each other in the middle of 1945, and by the end of 1950 the monthly production based on curve No. 1 is twice that of No. 2, despite the fact that several wells drilled in 1940 and



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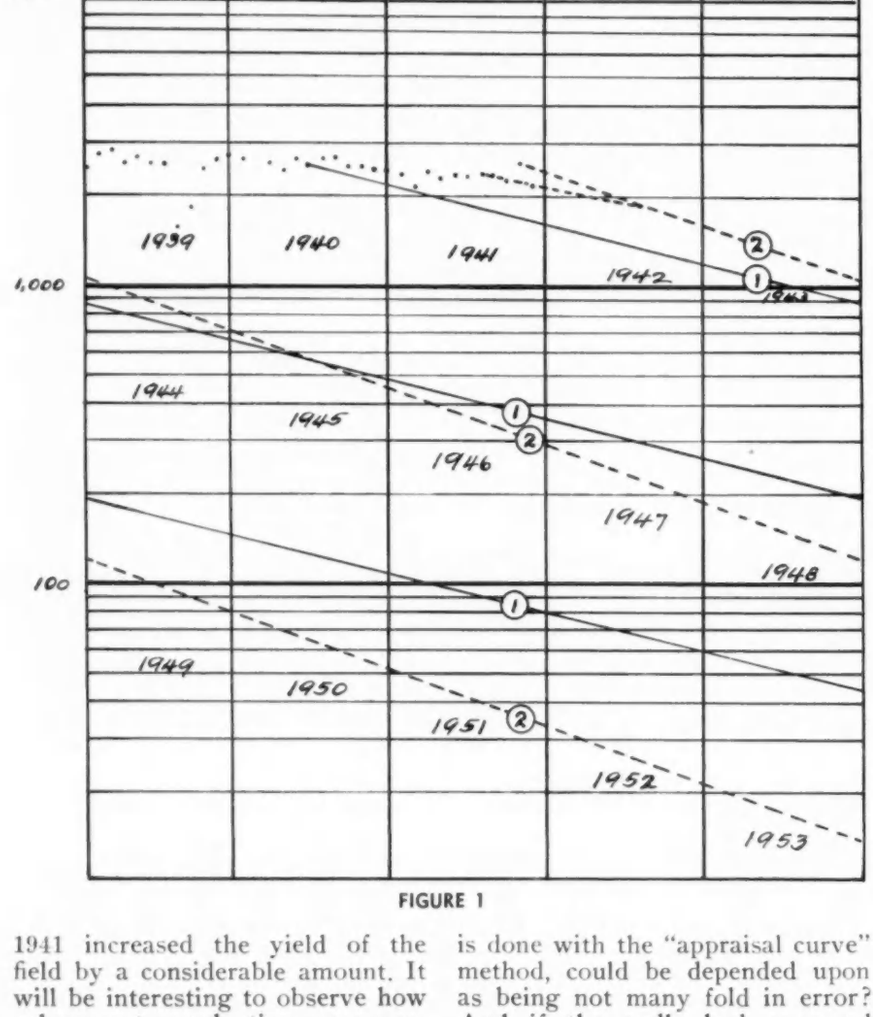

FIGURE 1

1941 increased the yield of the field by a considerable amount. It will be interesting to observe how subsequent production compares with these curves.

In discussing decline curves, E. W. Shaw[5] states: "It should be borne in mind that the curves are sketched, and hence that two persons would not draw them just alike. It is evident, also, that a field of small extent and uniform conditions, even when divided into many properties, will give a denser pattern of dots than a large field of various and varying sands and other irregularities. Also, a field each of whose properties is quickly drilled up will give a different diagram from one where the leases are only gradually drilled . . . The question naturally arises, how much better are these estimates than the guesses of experienced operators? Could not almost any good oil man make at the end of a year of production of one of his leases, a guess at the future production of that lease which, barring accidents and unusual features, as is done with the "appraisal curve" method, could be depended upon as being not many fold in error? And if the wells had averaged large, so that a larger fraction of the ultimate output had already been produced, might not his guess be accordingly close to the true figure?"

Reserves Estimated By Multiplying Initial Production By a Factor

The method of employing the initial production as a gauge of the ultimate recovery by multiplying this initial by a factor determined by results obtained in a given area, is one of the oldest methods. Lewis and Beal[5] state that wells in the Nowata area, Oklahoma, at depth of 300 to 500 feet, with spacing of 5 acres per well, and having an initial average of 30 barrels daily for the first year will make a minimum of 24,600 (30 x 820) barrels per well, and a well averaging 100 barrels per day for the first year will average 47,500 (100 x 475) barrels ultimate recovery per well. In the Osage area at depth of 1500 to 2500 feet, a well with average initial of 30 barrels per day will make at least 24,600 (30 x 820)) barrels per well as the ultimate recovery, while a 100-barrel well will make 84,000 (100 x 840) barrels per well.

Beal[7] states that in the Osage Nation "the area drained by productive wells is approximately 30,000 acres, so that the average total production per acre is approximately 3000 barrels. It should be remembered that much of the production included in the total output is only a few years old, and that the wells producing this oil will yield more in the future, so that the ultimate production of the Osage Nation will be considerably more than 3000 barrels per acre . . . For several hundred wells in the Bartlesville pool the daily average production per well the first year is 17 barrels, ranging from 2 to about 150 barrels. A production of about 20,000,000 barrels has been obtained from 306 properties having a total productive territory of about 11,000 acres, or an average of about 1800 barrels per acre." Referring to the Nowata area, Beal[7] states "the minimum ultimate production of the property underlain by a productive sand 28 feet thick is about 1.2 times, and the maximum ultimate production of the same property is about 3.9 times its first year's output." At this time the Nowata area covered about 48,000 acres of drilled territory. The Glenn pool covered an area of 19,000 acres from which about 140,000,000 barrels had been recovered or not quite 7400 barrels per acre from a productive thickness of 30 feet, or about 245 barrels per acre-foot.

Requa[6] stated that factors by which to multiply the average initial daily production of the first year to obtain the ultimate recovery of wells in various fields in California were as follows:

Field	Factor by Which to Multiply First Year's Production	Factor by Which to Multiply Avg. Daily Production of First Year
Fullerton	5.738	2,074
Kern River	5.5	2,008
Maricopa	4.452	1,515
McKittrick	5.738	2,094
Midway	4.976	1,716
Santa Maria	4.273	1,560
Santa Maria (except N. & H.)	4.3805	1,599

In discussing Requa's findings, E. W. Shaw[6] commented: "The ultimate production of the large wells falls short of being propor-

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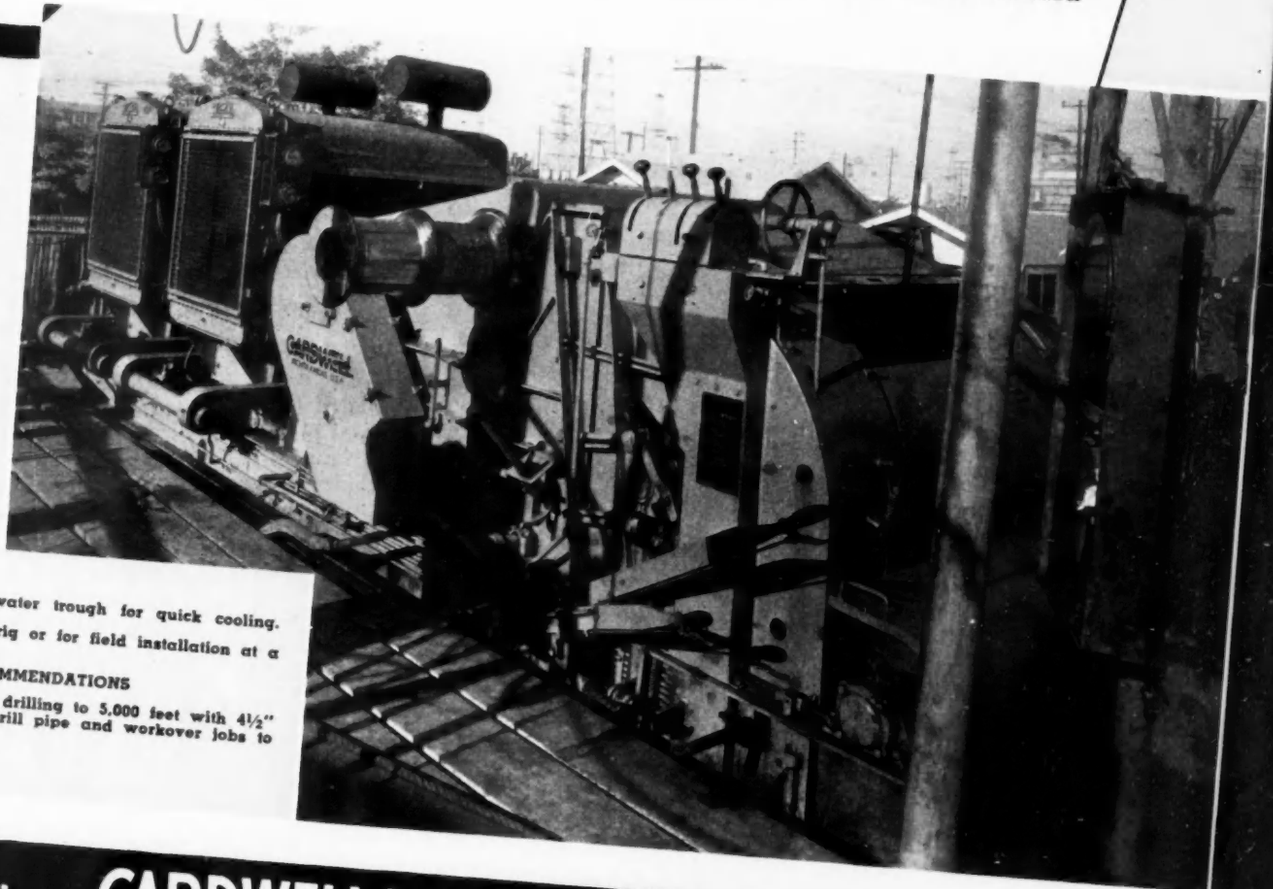

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tional to their initial capacities (compared with small wells)."

When using the factor method, it is necessary to have the results of similar fields, also it is necessary to wait until after a year's production has been obtained while producing at maximum capacity.

These factors can be derived from the semi-log decline curve, where figures have already been obtained in areas of similar characteristics over a period of sufficient duration to assure the factor being reasonably close.

This method was employed by the writer in making estimates on a considerable number of leases in the Oklahoma City field, and the estimates so made on basis of 17 times the initial day's production for the total cumulative production of the wells have been found to check more closely with the recovery that has been made than the estimates made at the same time by other methods. In this case it was necessary to employ factors that had already been obtained on other wells in the same field but in another zone, which had reached the point of depletion closely enough that a definite decline curve fairly closely indicated the end point. It was found, however, that this factor of 17 was far from applicable to wells in extensions of this field which were not drilled until some years later, and where the reservoir pressures had declined to one quarter those that existed when the field was first being developed. This factor of 17 times the first day's initial seems low compared with figures mentioned by Beal and Requa, but it should be remembered that the reservoir pressure in the Oklahoma City field was about 2600 pounds per square inch and the reservoir sand was up to 200 feet in thickness and very porous, therefore, very large initials could be expected in wells in a reservoir of this character.

Donoghue[20] cites instances of wells in the Smithwick limestone formation spaced on basis of 10 acres, in which the following factors for ultimate recovery were obtained:

Initial Production Range in Barrels	Number of Wells	Average Barrels per Well		Factor by Which to Multiply Initial per Day
		Initial	Ultimate	
0 to 100	12	55	35,416	644
100 to 200	31	153	48,797	319
200 to 300	17	243	56,775	233
300 to 400	2	353	93,102	264
400 to 500	2	447	113,863	255
500 to 600	3	556	152,524	274
600 plus	12	945	227,552	240

These wells were arranged according to another classification as follows:

Ultimate Recovery Barrels per Well	Number of Wells	Average Initial per Well	Average Ultimate per Well	Factor by Which to Multiply Initial
0 to 25,000	17	121	14,784	122
25,000 to 50,000	17	155	35,878	231
50,000 to 100,000	24	256	70,056	274
100,000 to 150,000	13	416	123,211	296
150,000 plus	8	985	293,955	298

In both of these classifications it appears that the factor by which to multiply the initial production is not greatly reduced for large wells from those for the small wells. In the second classification it may be noted that with the exception of the factor for the range of zero to 25,000 barrels ultimate recovery, the factors range from 231 to 298, and are, therefore, not greatly different.

This method is applicable only to wells in which the initials are taken at maximum rate for a given period, usually over a period of 24 hours, and when reservoir pressures are not greatly changed by large recoveries having been made between the times when the factors are determined. They must also be based on some actual past performances in wells of the same characteristics in the same general locality.

Method of Estimating Reserves Based on Comparing Accumulative Recovery With Pressure Decline

The method of estimating ultimate recovery by plotting a decline curve of reservoir pressure against ultimate recovery was forecast to some extent by E. W. Shaw in 1918 in discussing paper by Requa[6], in which he states: "Measurements of pressure are of greater value in appraising gas lands, but can be used to advantage, I believe, also for oil, especially where there is considerable gas with the oil. The comparison of closed pressure decline and volume produced, perhaps first outlined in the report referred to above (U. S. G. S. Bull. 629), may be of considerable value. If a well yielding gassy oil has a closed pressure of 1000 pounds at one date and, after yielding a measured but not large quantity of gas and oil, drops to 100 pounds, the quantity remaining in the ground is presumably much smaller than if, with the same output, the pressure had dropped only to 500 pounds. Of course in the absence of gas this side light could not be used."

This method has been employed in plotting accumulative production against actual bottom-hole closed-in reservoir pressure, and in some instances has been found to have some value, but caution is undoubtedly necessary in attempting to apply it until more data regarding its limitations have accumulated. This method was employed to some extent in the Oklahoma City field, but the latter life of the wells showed a flattening out of the curve, since with depletion of the gas, the pressure line was close to the zero point, compared with initial pressure of 2600 pounds. It has been employed by the writer on a large number of individual wells in the Turner Valley field, Canada, and with the extraction of perhaps 50 to 75 percent of the recoverable oil appears to hold good as a straight line on cross-section paper. However this field is spaced at 40 acres per well, and with porosity at an average of possibly 10 percent, there is little interference between adjacent wells moreover, it was necessary to take closed-in pressures over a period of 10 to 30 days in the high-pressure areas because of the slow building up of the reservoir pressure around the well, while equilibrium was being established. Bottom-hole pressures taken at the end of a 24-hour period were of no value whatever for this purpose.

At the Dallas meeting of the A.I.M.E in October, 1941, attention was called by a speaker to the inapplicability of this method of estimating ultimate recovery in fields affected by pressure maintenance, or where natural or artificial water drive has maintained wholly or partly the reservoir pressure, even though considerable percentages of the oil has been extracted. This method would, therefore, seem to have no

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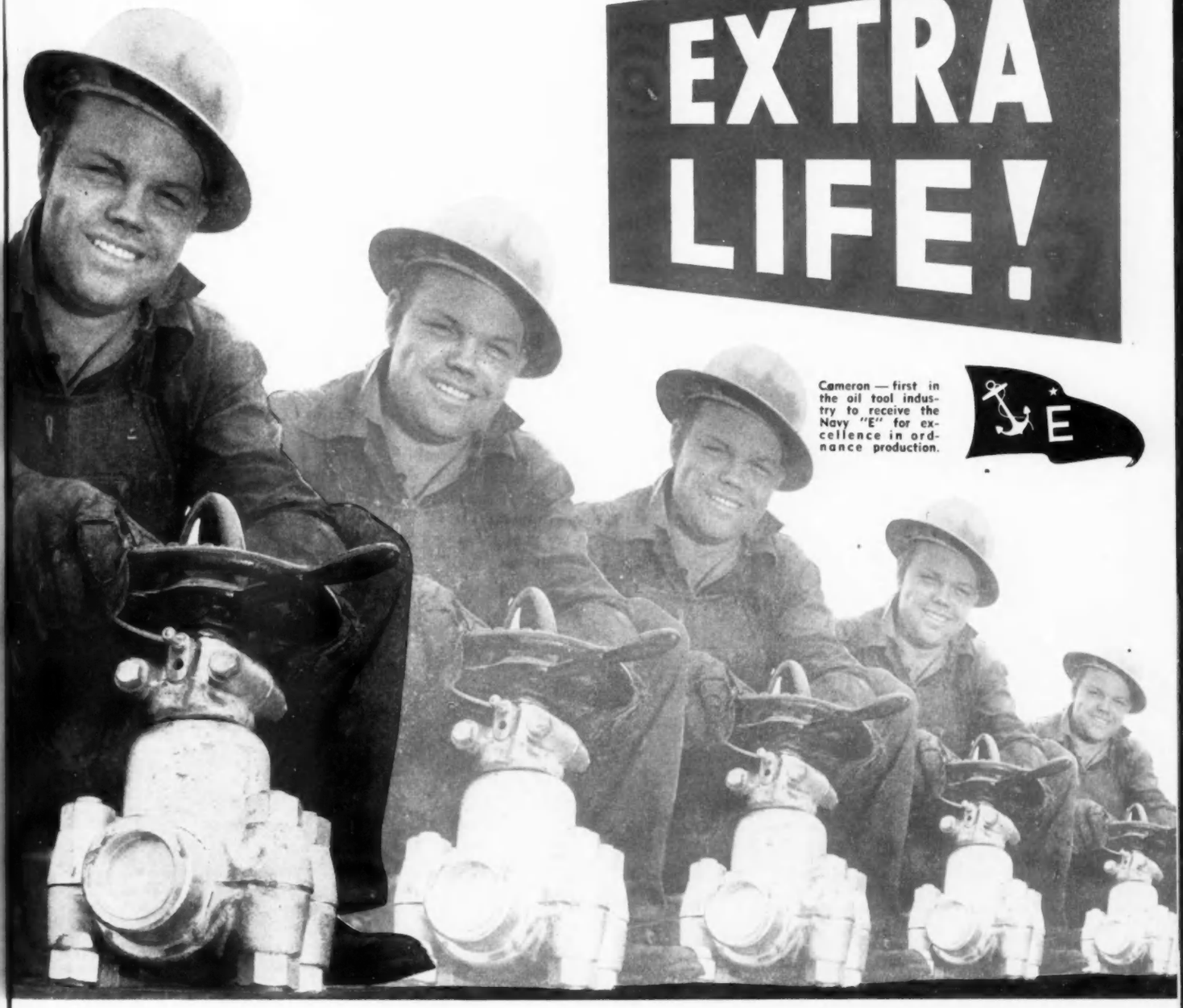

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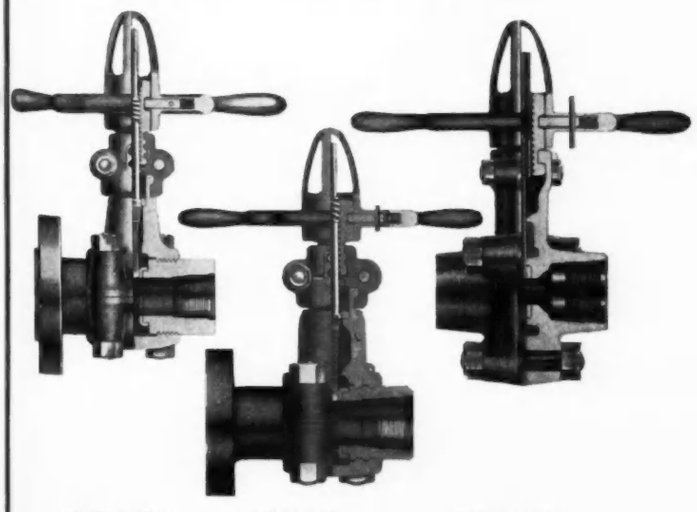

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application for instance in East Texas, Silsbee, South Burbank, Sugarland or Tepetate. In one of these fields studied by the writer, the reservoir pressure had shown no decline under natural water drive over a period of two years or more, even though important quantities of oil and water had been extracted during this period. At the same meeting at Dallas, T. V. Moore also called attention to the fact that no extrapolations of reservoir pressure curves are employed by his organization for the purpose of making estimates of ultimate recovery.

A variation of the pressure-production decline curve is stated in a recent publication of the Bureau of Mines[24]. This method depends upon plotting cumulative reservoir pressure decline against cumulative production. The graphs included in this paper seem to indicate that there is usually a marked deviation in the decline curve in the latter part of the production of the fields selected as examples in this paper and, therefore, would have to be employed with caution when estimating reserves of a field. However, the tendency appears to be on the conservative side of estimation.

Conclusions

The conclusions drawn from this review are as follows:

1. Factors for determining the ultimate recovery of oil are many and varied, and are as yet far from being thoroughly understood.

2. Methods of estimating ultimate recovery of oil are far from being perfect, but are gradually being improved as a better understanding of the various factors is obtained.

3. The most satisfactory method of estimating oil reserves yet devised is that obtained from elapsed-time-production decline curve on logarithmic cross-section paper, but this method may be affected by changes in methods of production. This method of estimation can not be used satisfactorily when production is at a restricted rate.

4. The tendency of the elapsed-time-production graph for estimating reserves seems to be on the conservative side, while that of estimation by volumetric or saturation method seems to result in an exaggerated estimate.

5. Percentages of 10 to 20 percent recovery, as stated in early days, was only an opinion, and applied only to shallow reservoirs with tight formation rock, and only to primary methods of production. It was the best expression of opinion obtainable in early days, based upon the scanty evidence available at that time. Such a figure never has had, or does not now have, any application to recoveries obtained in the average producing fields of the United States, and should never be used as a basis of comparison for different methods of production.

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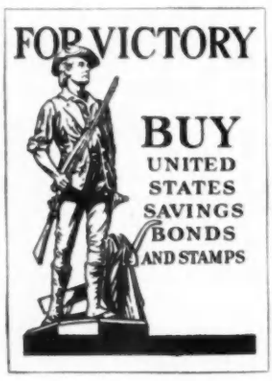

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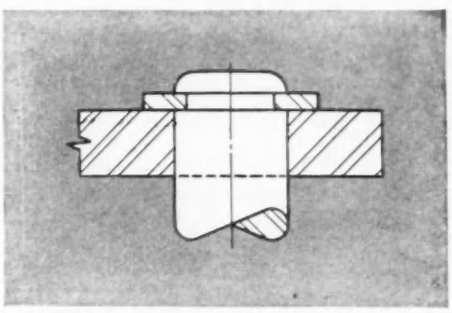

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Selection of Internal Combustion Engines

PART 4—Engine Accessories and Costs

By EMORY N. KEMLER
Associate Professor of Mechanical Engineering, Purdue University

ONE of the factors which makes the selection of an engine difficult, in addition to the differences in design, is the wide difference in accessories which are normally furnished with an engine. The difference in accessories can make very decided differences in the price quoted on a particular engine. Where purchases are handled on a price basis only, serious difficulty may be encountered because of the substitution of inferior or incomplete auxiliary equipment. For an engine which is to give long service with low operating cost, the accessories may cost almost as much as the bare engine itself. In order to simplify comparison of equipment, the engineer should prepare a specification covering the general type of accessories to be used. Where a specific type or make of accessory is required, he should be careful to make this clear. For example, if a particular make of air cleaner is to be furnished, that fact should be indicated in the specification rather than to indicate that an air cleaner is to be furnished. The preparation of such a purchase specification will make quotations more nearly uniform and will make easier the comparison on a price basis. As was indicated in the first article, the cooling and exhaust systems have a very important bearing on the engine performance and maintenance. In addition, the power takeoff fuel system and lubrication system also have an important effect on the engine performance and life.

(1) Fuel Systems

The preceding article discussed many of the problems of fuel selection. When the type of fuel has been selected, the engineer can prepare specifications for the fuel system. The type of fuel to be used should be specified. This gives the manufacturer data from which the compression ratio which he will furnish can be determined. Because the compression ratio depends on both the design and the fuel, it is preferable to leave the selection of the proper compression ratio to the judgment of the manufacturer. In the case of a gas engine, the type of pressure regulator and carburetor should be specified if they are not to be standard. If the engine is to be started on gasoline and then operated on gas, this should be stated and a gas-gasoline carburetor specified. In the case of an oil or diesel engine, the type of injection system should be specified if it is to be other than manufacturers' standard. In case crude oil is to be used, some type of treating system may be desired. If the local operating conditions are such that dust may be drawn into the air intake system, an adequate air filter should be installed. The air filter is justified if piston, cylinder and ring wear are reduced. If the engine is to be operated on butane, apporval of the fuel system has to be approved by the Fire Marshal or other department in some states. For proper operation of a butane system in areas where extreme cold weather is encountered, provisions must be made for vaporizing the fuel, and removal of any moisture to prevent freezing up of the fuel system. Such systems must normally be carefully designed to prevent operating trouble. In the case of a gas or gasoline engine, the type of ignition system to be used will depend on the type of service and type of engine. The kind of system to be used must be specified if it differs from manufacturers' standard.

(2) Cooling Systems

The types of cooling systems which are available and commonly used for oil field service are hopper cooling, thermo-syphon system, circulating tank with forced circulation, radiator cooling, vapor type cooling and heat exchanger type of cooler. The use of hopper cooling is generally limited to small and low cost engines. Its low initial cost and the fact that where good water is available, little maintenance is involved makes it adaptable where low investment is important. Such applications will either be on very small installations where very little power is required or where intermittent service is encountered. The disadvantages of such a system are the necessity for refilling the hopper, cleaning difficulties where poor water is available, the necessity of draining where cool weather conditions are encountered, and the limited heat dissipation capacity of such a system.

The thermo-syphon system used in connection with a cooling tank is an improvement of the hopper cooling system but again is not so satisfactory for most installations. It is not a positive circulating system, and may give operating difficulties. The use of a positive driven pump in connection with a cooling tank is an improvement over the thermo-syphon system and increases the heat dissipating capacity of the system. The use of a cooling tower in connection with a circulating tank will increase the heat dissipating capacity further for a given size of tank. Either of these systems of course required draining if shutdown occurs during cold weather inasmuch as it is impossible to add anti-freeze in an open system. The conventional radiator system with a water pump to give circulation and a fan to increase air movement about the radiator is a more compact installation. The advantages of the radiator system are the lowered water requirements since the evaporation is largely eliminated and the fact that anti-freeze can be

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used. In places where bad water must be used, the use of a radiator will possess very decided advantages since it will largely eliminate water treatment and should result in lower operating cost since scale and other deposits will not be present. This should result in much lower cylinder wall temperatures and longer life of the equipment. One difficulty with such systems is the tendency to use radiators which are too small or the improper mounting of radiators which will result in mechanical failure of the radiator parts. The fan and pump may require some attention. The vapor type system has been used to a limited extent and where it is adaptable may offer some advantages over other systems. Where its capacity is within that required by the engine and if the water passages are properly designed, it should give very good temperature conditions since it is in itself an automatic thermostat. The use of a heat exchanger is of course similar to the use of a radiator. Instead of using air as the medium to which heat is rejected, some other fluid is used in connection with the heat exchanger to fill this need.

For large plants cooling towers may be necessary. Cooling towers may be of the natural draft, induced draft or forced draft type. The type and size of tower required will depend upon atmospheric temperature and humidity as well as the intake and discharge temperatures on the water side. Where lots of space is available, some form of spray pond may be used. This type of cooling requires considerable makeup water. It has a lower investment than radiator cooling in most instances. The type of cooling to be used will depend on local conditions.

Since an engine can easily be damaged by overheating as a result of loss of circulation or excessive water temperature, some type of safety device is desirable. If an engine is to be operated without constant attention, a safety switch on the water outlet will be desirable. This switch will shut off the engine if water temperature becomes excessive or if circulation is stopped. If an engine is to be operated over a wide range of temperature conditions, a thermostat will be desirable. Too low a water temperature is as undesirable as too high a temperature.

Power Takeoff

The power takeoff system is very important on almost all engines used for oil field service. Most oil field service is severe in that shock or variable loads are often involved. In pumping service, for example, the engine load goes from a maximum to nearly zero twice during a single pumping cycle when the engine is used on a well counterbalanced well. The load will actually reverse with the well driving the engine if the well is not properly counterbalanced. This type of loading imposes very severe conditions on the clutch and engine. A heavy duty type industrial clutch capable of handling these heavy overloads is necessary. The automotive type spline clutch is not generally adaptable to this type of service.

Regardless of how nearly correct the well is counterbalanced, the load on the unit will vary from a maximum of twice or more of the average load, to nearly zero twice during the pumping cycle. The only way the requirement on the prime mover can be smoothed out is by the use of a flywheel. The flywheel will store energy during periods of low power requirements and return this energy during periods of high requirements. If an engine is governor operated with little flywheel effect in the system, the governor will be continually opening and closing, resulting in speeding up and slowing down the engine. This type of operation is very undesirable and under extreme conditions will cause high operating costs. If the engine is throttle operated, the peaks are eliminated but the engine speed will still vary widely with similar effects. Many combinations of operating methods can be used to eliminate the peak loads. Unless a heavy flywheel is used, considerable speed variation will still exist. The size of flywheel required will depend on engine speed and size. In the case of multicylinder engines, the flywheel size is limited by the size of clutch housing. In case a large flywheel is desired, changes may have to be made in the clutch housing. When the engine is used for such service as driving a fan or rotary pump, the load may be sufficiently uniform so that a large flywheel is not necessary. Other types of service such as use of engines to drive electrical generating units also require the use of large flywheels if the speed variation is not to be sufficient to cause excessive varations in voltage.

Where heavy belt or chain loads are carried on the clutch shaft, trouble can be avoided by the installation of an outboard bearing. Care should be taken to specify shaft sizes, keyway sizes, pulley or sheave size and details. The careful specification of these details will eliminate much difficulty in the field because of improper size or type. While the use of outboard bearing, heavy flywheel or heavy duty clutch appreciably increases the cost of an installation, their use when necessary may bring about large reductions in maintenance cost.

Lubrication System

Proper lubrication in an engine is very necessary for long life and low maintenance expense. Besides using proper lubricating oil, it is necessary to get it to the point where it is needed and in the condition required. Where a force feed system is used, the operator's experience may show that some particular make of lubrication has given him better service for the particular conditions encountered. In this case he may wish to specify type of lubrication. To protect the engine against failure because of lubricating oil pressure reduction as a result of loss of oil through such causes as broken lines, an oil pressure safety switch may be desirable. In order to eliminate direct or other undesirable material from the lubricating oil, an oil filter may be desirable. In larger engines some type of oil cooler may be necessary to maintain the proper viscosity characteristics of the oil. Here again, the introduction of proper accessories may mean increased life and lower operating expenses. The use of these devices will not allow the engine to deliver any more power but they do have something to do with engine life.

Miscellaneous

When it is realized that an internal combustion engine when used as a power unit is in reality a complete power plant, the reason for so many accessories being required can be appreciated. While the above classifications lists many of the important accessories, many of the miscellaneous groups may be equally important or necessary. The state safety regulations normally require some type of starter on the smaller engines, and necessity requires it on the larger engines. Electric starters are used on the smaller multi-cylinder engines. When they are specified, provision should be made for battery and

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generator. For some of the larger multi-cylinder engines, an engine starter is used. This engine starter can frequently be used for generating of electricity if desired. For most larger engines and for single-cylinder engines air starting is used. This requires the use of an air compressor, air storage tank and starter valve.

As has been indicated previously, some type of speed control is necessary. The type of governor to be specified will depend on the type of speed control necessary. In order to prevent the engine from running away if the governor fails, an overspeed device may be necessary or desirable.

The type of exhaust system will depend on the local conditions and the type of engine. If it is to be used where noise is a problem, a muffler must be specified. On a multi-cylinder engine the location of the muffler should be specified. For a large engine the location of exhaust ports and size of opening should be specified. On multi-cylinder engines a water cooled exhaust manifold may be specified if it is necessary to work around it or if fire hazards make its use desirable.

When the engine is to be used as a power unit, some type of housing may be desirable. Safety guards should also be specified if desired. Other items which should be specified are foundation bolts and instruments to be furnished with instrument board, if one is desired. The above lists most of the general accessories commonly specified for use with engines. Each case presents its problems and may require more or less instruments.

Cost Comparisons

Another important factor which enters into equipment selection is the method of making repair charges and the method of handling fixed charges. The use which the management makes of such data may also influence the engineer in his method of equipment selection. If for example fixed charges, i.e., interest, depreciation, obsolescence, etc., on the initial investment are not included in the overall cost, and all attention is given to repair expense, the engineer will tend to select that type of equipment which will give the lowest maintenance expense with little regard to the initial cost. The method in which operating labor and fuel costs are charged will also influence the engineer in his selection.

Any comparison between types of equipment must take into account the following items:

1. Operating labor expense as influenced by type.
2. Fuel expense.
3. Maintenance expense on engine and auxiliary equipment.
4. Fixed charges on engine and auxiliary equipment.

To arrive at a true comparison between types, it is necessary to include the engine and all of the auxiliaries necessary for its proper operation. In addition such factors as foundation cost must also be included since this item may vary from one type of engine to another. The following table lists many of these items:

Initial Cost of Engine Installed

1. Foundation, slide rails, etc., plus any cost necessary to leave location in original condition.
2. Exhaust system including muffler if necessary.
3. Cooling water system including water well and pump if necessary, piping, radiator, water tank, or other equipment if used.
4. Cost of engine.
5. Cost of accessories for engine (controls, instruments, etc).
6. Cost of auxiliary equipment such as starter equipment, air storage tanks, batteries, etc., as may be required.
7. Cost of drive as influenced by engine speed or location.
8. Cost of power takeoff equipment.

Operating Expense of Engine

1. Operating labor if particular engine requires more labor than required by operation of other machinery or plant.
2. Repair parts on engine and auxiliaries.
3. Repair labor on engine and auxiliaries.
4. Supervision.
5. Miscellaneous expense relative to making repairs, such as car or traveling expense, overhead, tools, etc.

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Fixed Charges

1. Interest on entire investment.
2. Depreciation on recoverable investment over a reasonable life period.
3. Depreciation on unrecoverable investment over life of installation.
4. Taxes on taxable investment.

The initial cost of the engine installed will vary considerably depending on the size and rating placed on the engine. Particular care must be taken to compare the engines on the basis of equivalent power output. Even on this basis there will be considerable differences in the cost of the various elements. The slower speed engines will require larger foundations, engine house or space, and in general a larger drive. The comparison must take into account the type and cost of the cooling system. When determining fixed charges on the equipment some estimate must be made as to relative or probable life of the various types of engines.

The operating expense will vary with the type of fuel. For example, the operating cost of a diesel engine may be higher than for a gas or gasoline engine. The fuel cost may be lower. A comparison between the two requires specific information of the probable operating expense. Comparison between high and slow speed engines must likewise compare probable operating costs Unfortunately such costs are very difficult to evaluate because of variations in loading conditions and operating personnel Only by careful study of cost records can reliable data be accumulated.

Another use of cost records is that of locating sources of trouble. Careful study of cost records may show that some particular part of the engine is responsible for a large portion of the expense When such trouble is located changes in design, materials or operating conditions can be made to reduce such costs. Such an analysis can give very worthwhile results.

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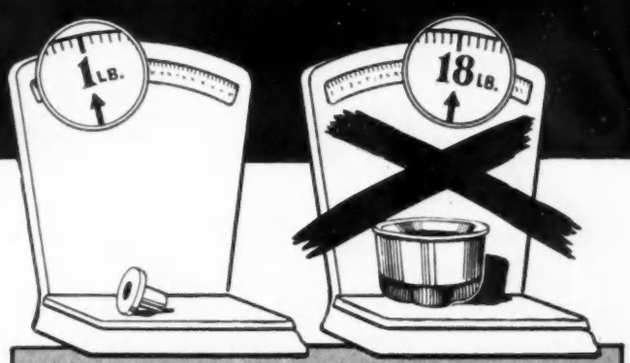

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Reconditioning Old Line Pipe For Relocation

WITH the industry currently taking up several old pipe line systems and relaying them elsewhere to provide additional overland transportation facilities, and other similar operations due to take place in the near future, the practices and problems encountered in such work is of interest.

The accompanying article describes the work of relaying two pipe lines, which when taken up showed numerous pits that required reconditioning most of the joints. One of these was a four-inch line and had been used for shipping refined products, while the other was an eight-inch employed for crude transportation. The four inch was an all welded line and had been originally covered with a bituminous coating against exterior corrosion. The eight-inch system was a combination welded and screwed line, the screwed section much older than the welded portion. The old line had a covering similar in composition to the four-inch coat, while the newer part had been coated with a composition covering that was applied to both lines when they were prepared for relaying.

Removing the pipe from the ditch was accomplished by the conventional method, employing a ditching machine to uncover and then using a side-boom equipped tractor to lift the pipe above the ground level where it was cut at the original welds with an acetylene torch into joints. Both sizes of pipe passed through similar processes while being reconditioned, repaired, tested and recoated. Accompanying photographs illustrate these steps which took place at a central plant prepared for the purpose.

Much of the pipe in both the 8 and 4 inch lines would have been rejected for relaying before tubular goods became scarce, but the company decided under the circum-

1. After being removed from the old ditch, the pipe was carried to a central reconditioning plant and stacked until ready to be cleaned. The first operation was to burn the old coating from the pipe, as shown at right. Gas torches were used for this purpose, a heating flame was successfully passed through the interior of the 8-inch pipe by placing gas torches on the end of long smaller pipe sections. This left little other work to be done in clearing away all the original coating and adhering soil.

2. After being heated and the old protective coating removed, the pipe had the appearance shown at left.

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Hard-facing is the process of welding on to wearing parts a coating, edge, or point of a hard metal —usually a special alloy possessing exceptional wear resistance. By this method, it is possible to protect metal surfaces that normally wear away rapidly in service. This process can be applied with equal advantage to new parts before they are used, or to worn parts.

Hard-Facing Increases Service Life

Hard-facing gives considerably longer life to wearing parts of many different kinds. Depending on the hard-facing rod used and the service to which the part is subjected, a hard-faced part will last from two to twenty-five times longer than a steel part that has not been protected by this method. Most parts can be hard-faced again and again.

Less Shutdown Time

As a result of the increased life of hard-faced parts, fewer shut-downs for replacements are necessary. This avoids lost time for both labor and equipment. In addition, problems of obtaining replacement parts are often completely eliminated.

Less Steel Waste

Many parts that would otherwise have to be sent to the scrap pile can be salvaged by hard-facing and quickly put back into service at a cost considerably less than that of replacement with new stock. And since such salvaged parts usually can be hard-faced repeatedly, it is possible to reduce the stock of reserve parts.

Lower Power Consumption

Parts that are used to cut, scrape, or drill stay sharp longer when they are hard-faced. This reduces power consumption, and helps maintain a uniformly high overall efficiency.

Substitute Base Metals

Substitute base metals that are more readily available than special steels can often be used in the fabrication of parts if hard-facing is employed. The metal can be selected for core properties without regard to wear resistance, and wearing surfaces can then be protected by the welded-on hard-facing deposit.

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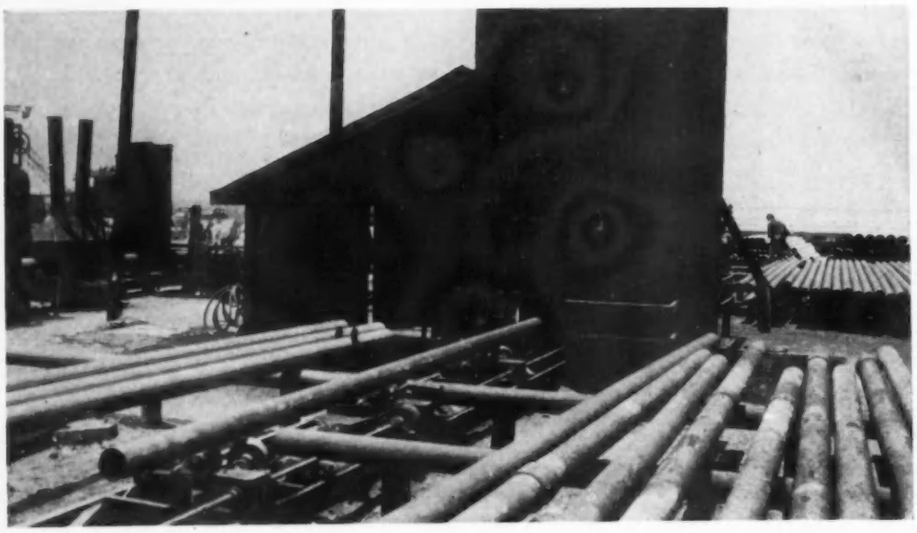
stances that it would be advisable to recondition the pipe instead of purchasing new pipe. This same company had a short time previously reconditioned several thousand feet of pipe, which operation cost more for filler rods and current than new pipe would have cost, but as one executive remarked "It is better to use what we have, even at great cost, than to ask for new material when it is so badly needed elsewhere."

After being reconditioned as described in the accompanying pictures, the pipe was trucked to the new right-of-way and relocated as if it were new pipe. During these operations the coated pipe was handled with care. Saw-dust bags were put between the pipe surfaces when being hauled to the newly cut ditch. The reconditioned pipe was welded on skids above the open ditch, employing the stovepipe method. After each well was made, the joints were covered with a coating material similar to that already applied to the remainder of the pipe. After the coating material at the joints had cooled and set, the skids were removed and the line lowered into the ditch.



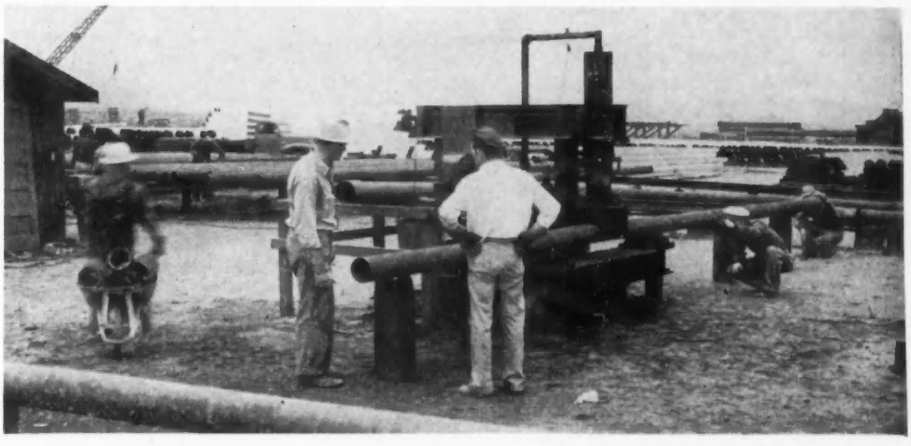
3. The next step was to pass the pipe through cleaning equipment to remove rough scale and corroded material. The surface was cleaned by blowing steel grit with compressed air against the pipe. This removed most of the looser oxide and scale, uncovering the pits and damaged sections. Careful inspection was made of each joint, inspectors marking all parts to be cut away and all pits to be filled with yellow crayon. Sections too badly damaged for further use were cut out.

4. Pipe with collars attached received the same kind of treatment, after which the collars and threads were removed and beveled for welding into the new line. Welders used the conventional type of cutting heads on the torches, but butane in lieu of acetylene. Required beveling and cutting were done in one operation by using proper guiding clamps. The rejects and stubs with collars, as well as threaded ends, were hauled to scrap collection centers.

5. After the ends had been removed and damaged sections cut out, the pipe was in widely varied lengths. Consequently, the next operation was to join two or more short joints of pipe to furnish standard length joints.

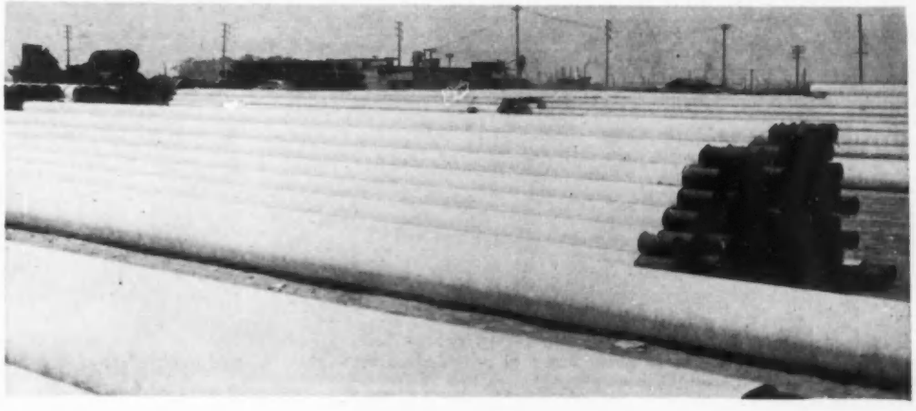
6. Following the welding together of short sections, spotters took charge and filled in the pits with electric arc welding rods. It was easy to spot the pits because inspectors had marked them with yellow crayon.

7. A section of deeply pitted pipe after being reconditioned by applying welding metal to fill the pits. Occasional joints had practically no pitting, while others were almost covered.



8. The pipe next passed through a hydraulic straightening machine, which removed perceptible bends.

9. Next each joint was subjected to pressure tests, following which they were given a second cleaning operation to remove all oxide and flaked metal to provide a clean metal surface for application of coating material.



10. The reconditioned and recoated pipe stacked in the yard preparatory to being trucked to its new location for reburying. Meanwhile, the new ditch had been cut and the line was welded together as quickly as possible.

Adjustable Set-Up Betters Measuring Line Control

POWERING of the measuring line reel when this is used for running bottom-hole survey equipment usually relies upon some sort of take-off in which the cathead or a sheave adjacent thereto serves as driving unit.

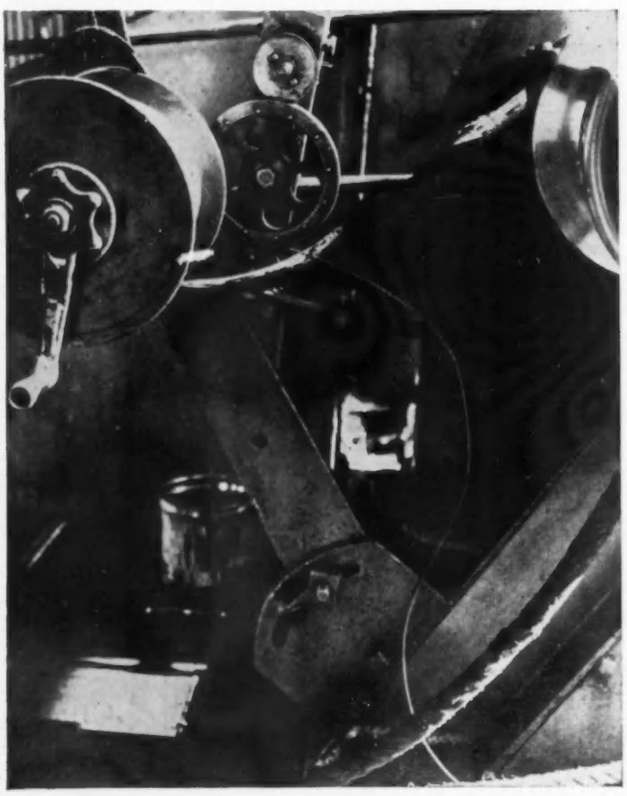
When a V-belt is used in a sheave mounted on the cathead shaft, it is possible to use a set-up in which the tension may be regulated and an extra man as belt tightener is dispensed with. A bracket of heavy flat steel is welded to the frame of the drawworks just behind the cathead head bearing, a hole near the base of this bracket serving as center for a curved slot cut near the outer edge of the bracket. Pinned through the bolt hole and with a second bolt placed to slide in the curved slot, is set an arm which carries the measuring device and the reel upon which the line is wound, the reel being provided with a V-belt pulley at the end nearer the supporting arm to minimize twist from the belt pull.

To drive the reel it is necessary only to slip the V-belt over the two pulleys, to loosen the tightening screw on the arm and to swing it away from the cathead until the desired belt tension is secured, after which the clamping bolt is tightened to maintain the setting.

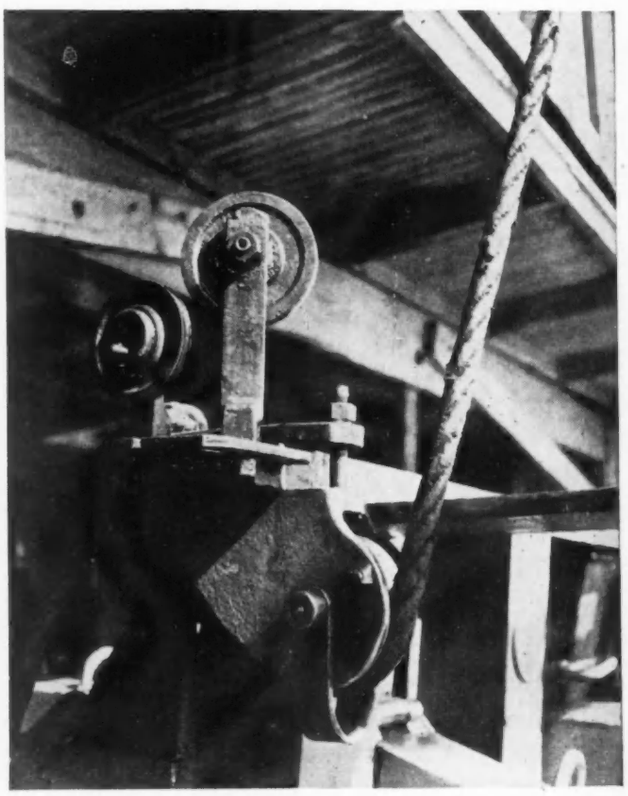
In order to feed the wire line in to the measuring unit evenly and permit accurate spooling, two sheaves, individually mounted on arms carried above a plate welded as extension of the top member of the drawworks frame, are employed. Each of these sheaves is carried on an arm, terminating at its base in a threaded section which fits within a slot cut into the base plate, and fitted for tightening with a nut below the plate.

The supporting arms are of unequal heights, enabling the line to be brought in over the higher or front sheave, and under the second or lower unit for the lead to the winding drum. By setting these two sheaves with their adjacent sides in line, it is possible to accomplish marked change in line direction without imposing twist on the line or incurring rubbing and undue wear against the sides of the sheave grooves.

Pressure-gun grease fittings on the heads of the bearing pins for the sheaves permit ample lubrication of the ball bearings upon which the sheaves rotate, and minimum drag is thus imposed on the line when running an instrument into the hole.

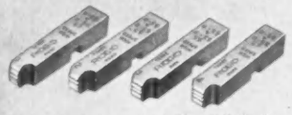


Bracket welded to drawworks frame with curved slot for locking bolt allows measuring reel arm to be adjusted to give desired tension in V-belt drive from cathead sheave to line drum.



Slots in supporting bracket permit both sheave stands to be rotated and adjusted to give straight-line transfer of measuring line over wide variation of entering and leaving angles.

A New Service to keep your RIDGID Pipe Tools on the job



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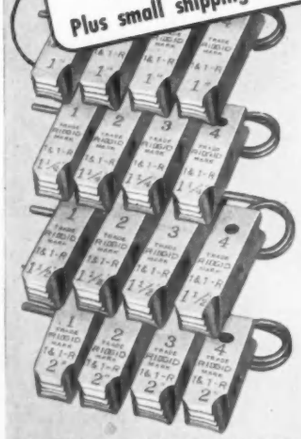

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Work-Saver Tools for America's Big Job in 1942

Scrap Rubber Drive Total May Reach Half-Million Tons

THE oil industry's scrap rubber drive came to an end July 10 with indications that possibly as much as 450,000 to 500,000 tons of rubber scrap would weigh in on the last tally.

A third progress report submitted to President Roosevelt July 6 by PIWC Chairman William R. Boyd, Jr., showed that the tempo of the drive was steadily accelerating, with 334,293 tons collected by the industry up to July 3, an increase of 115,295 over the preceding week.

While collections prior to the holiday had exceeded the estimates of WPB officials that not more than 300,000 tons would be collected, they were far below the over-optimistic forecasts that anywhere up to 10,000,000 tons would be secured, and competent observers in Washington expressed the view that not enough rubber would be amassed to avert nation-wide gasoline rationing as a rubber-conservation measure.

As the industry bent all efforts to making the drive a success, the uncertainty and confusion which has consistently surrounded the scrap-rubber-gasoline rationing argument persisted and, in fact, was intensified by President Roosevelt's comments on the matter at a press conference July 7.

While he probably knows more about the situation than most people, the President said, he himself could not write a clear news article about it.

At another point, he remarked, he is trying to save the country, not tires or gasoline particularly, and that if conditions become serious enough he may have to requisition every automobile tire in the United States.

But at another point, he commented that if he lived next to an oil well, had good tires on his car and spares in the garage, he would not be able to see why he should not use his car on essential business.

The President made it clear that he has not decided whether nation-wide gasoline rationing is the answer to the rubber problem, but said the scrap drive is not the cure-all for which the country has been looking. However, he said, he still hoped that the problem of rubber could be separated from that of gasoline, but he warned against over optimism because no solution has yet been submitted.

That public interest in the drive was keen was evidenced by the mail coming in to Washington. On July 8, Ickes received a suggestion claimed to provide 1,000,000 tons of rubber and a check for $100 from a man who had no rubber to contribute but wanted to help.

Suggests Garden Hose Sharing

The million tons of rubber, proposed by H. L. Allen of Roundup, Montana, would be secured by the extension of the car-sharing plan to lawn hose. Allen suggested that six neighbors could use the same length of hose, each one day a week, and thus contribute five lengths to the drive.

A Washington wag suggested that six lengths could be secured by a prohibition upon the sprinkling of lawns "for the duration."

The $100 check came from Mark J. Trazivuk of Hot Springs, Arkansas, who asked that it be used to purchase crude rubber, and suggested that the government encourage the collection of South American rubber by individuals in the Amazon basin, which he has visited several times and where, he said, there are millions of wild rubber trees which have never been visited by operating rubber companies. The check was turned over to Rubber Reserve Company.

Indignantly denying that the rubber drive had been disappointing, Coordinator Ickes declared July 9 that, on the contrary, the industry has made "a very good showing."

With a chuckle, the coordinator informed inquiring newspapermen that the "experts" in Washington had estimated that not more than 100,000 tons of scrap would be developed.

At a hearing during the week, Dr. Harry S. Rogers, chief of the WPB rubber branch, told a Senate Agriculture subcommittee that the 12 reclamation plants available would have a capacity of 320,000 tons a year. Of the rubber collected in the drive, he said, between 75 and 80 percent would be usable.

The board disclosed that it had acted on rumors that dealers were hoarding large volumes of scrap rubber in the hope of a better price than the $25 a ton set by the Rubber Reserve Company, but that inspections of scrap yards in every section of the country had indicated that "nearly 100 percent of the dealers so far visited have either sold or agreed to sell their whole stock of rubber scrap to Rubber Reserve Company of RFC, and to start the scrap on its way to rubber reclaiming plants as soon as Rubber Reserve Company issues shipping instructions." There were no signs of hoarding, it was said.

Board officials also disclosed that they are giving close study to the process for the production of butadiene perfected by Eugene Houdry, now being tested in a pilot plant by Houdry Process Corporation at Marcus Hook, Pennsylvania.

Arthur B. Newhall, rubber coordinator, discussing the process, which the company had been advertising in full-page "spreads" in Eastern newspapers, said WPB is not yet ready to say whether the process is better than others but gave assurance that if it is it will be incorporated into the plants now being built for synthetic rubber production.

During the week it became known that the extension of the rubber campaign had irked WPB Director Donald M. Nelson to the extent that he had written a letter to Coordinator Ickes protesting that it had interfered with a major salvage drive which he had planned to inaugurate July 1, and which has had to be postponed.

Nelson sent a copy of his letter to the White House, where it elicited no comment, but Ickes issued a statement declaring that the decision of the President to "do something" about rubber was wise and his move in extending the drive also was wise.

In his report to the President, Boyd submitted a tabulation of collections weekly by districts, as follows:

Districts	Population	Tons	July 3, 1942 Pounds Per Capita
DISTRICT 1 (East Coast)	53,800,000	72,699	2.70
DISTRICT 2 (Mid West)	48,131,000	146,448	6.09
DISTRICT 3 (South West)	16,277,000	43,661	5.36
DISTRICT 4 (Rocky Mtn.)	3,008,000	14,671	9.75
DISTRICT 5 (Pacific Coast)	10,775,000	56,814	10.55
Total	131,991,000	334,293	5.07

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P-13

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Southern Engine & Pump Company, Houston—Dallas—Kilgore, Texas
General Machine & Supply Company, Wichita Falls — Odessa, Texas
Western Machinery Company, St. Louis, Missouri • Centralia, Illinois

[*Continued from page 11*]

the new rationing system goes into effect, a "buffer state" will be erected along the western boundary of the rationed area, a 50-mile wide zone within which no motorists showing ration stickers on their cars will be allowed to purchase gasoline.

Considerable trouble has been encountered on the rim of the rationed territory, where car owners cross the line and buy all the gasoline they want while dealers just inside the line have no customers. There was no explanation, however, just how motorists will be prevented from driving across the 50-mile strip to fill their tanks.

The new rationing system also brought about a new subject of controversy between OPC and WPB over the latter's decision to abolish limitation order L-70, restricting deliveries of gasoline and fuel oil to 50 percent of last year.

While WPB held that the curtailment order would be superfluous under the new rationing system, OPC held its retention highly desirable and applied to the board for a reconsideration.

"I think it is proper and necessary to protect the little fellow," Coordinator Ickes explained, pointing out that elimination of the order might lead to a price war which would freeze the weaker dealers out of business.

"Our theory is that we do not want to do anything that would change the competitive condition of anybody in the oil business," he said. "We think this very distinctly would do that and would probably be catastrophic to a number of the smaller dealers who haven't a strong financial backing."

Ickes said he had heard nothing of rumors that the price of heating oils would be increased another 5 cents next winter or of contemplated orders requiring the bringing in of two tank-cars of fuel oil for every car of gasoline moved to the East Coast.

Tank-car deliveries during the week ended July 7 averaged 720,500 barrels a day, practically the same as in the preceding week, OPC reported.

☆

SYNTHETIC FUEL: Exhaustive studies of practical and economical methods of producing liquid motor fuel and lubricants from coal will be inaugurated by the Bureau of Mines at Pittsburgh, Pa., as soon as experimental equipment recently authorized by Congress can be installed, it was announced by Director R. R. Sayers, July 10.

With an appropriation of $85,000 granted by Congress, two methods of hydrogenation will be explored with a view to developing means to produce gasoline from the coals of Alaska and the United States, Dr. Sayers said.

The experimental plant, to be constructed adjacent to the Pittsburgh experiment station, will have a capacity of about 100 pounds of gasoline per day, but it is also planned later to build a pilot plant to handle about 10 tons a day and a small plant which can be moved and erected quickly and cheaper.

The bureau will continue its study of modifications of the Bergius hydrogenation process which it has been making for several years, but also will investigate the Fischer-Tropsch method, developed in Germany and now operating on an industrial scale in Europe.

☆

BARGES: Prices ranging from $339,000 to $1,084,000 each were quoted by boat builders competing for Maritime Commission contracts for non-propelled wooden barges in bids opened by the committee July 8.

Bidders from all three coasts, 24 in all, submitted proposals on the barges, which are to be 274 feet long with a draft of 20½ feet and a deadweight tonnage of 3750 tons. Contracts to be awarded will be made in lots of not less than 6 nor more than 24 barges to a single bidder, and deliveries must start within 210 days and be completed within 390 days from the date of award.

☆

ASPHALT: Decreased use of road oil, aiding the fuel oil situation, will result from action of OPC in extending to Districts 2 and 3 the restrictions on the use of asphalt, tar and their products imposed on District 1 April 24 in Recommendation 45.

Under that recommendation the use of asphalt and tar is severely restricted and it is prohibited for all but essential purposes, being permitted in public road and highway construction only under authorization from the Public Roads Administration and on private roadways only with the consent of the OPC director of marketing.

The new order, extending the limitations to another 21 states, will require shipments to halt July 12 to projects where materials and equipment are available and will call for cessation of use, without specific authority, on July 22.

It was explained that there now is an over-all shortage of asphalt throughout the country, and that refinery schedules for the last half of this year indicate that there will be 452,000,000 gallons less than required to meet minimum needs on the East Coast and 142,000,000 gallons less in the Middle West. District 3 will produce 38,000,000 gallons in excess of minimum needs, but the surplus will not permit unrestricted use and will be used to supply needs in Districts 1 and 2.

☆

PACIFIC DELIVERIES: Restrictions on deliveries of fuel oil to consumers in Oregon and Washington were lifted by WPB July 10 on the recommendations of OPC.

Amendment of Limitation Order L-56 to remove the two states from the curtailment order followed a showing that available bulk storage facilities have been filled by increased shipments, in order that consumers may stock up in their own tanks. The 50 percent cut in deliveries had been in effect since May 15.

☆

TRUCKS: Oil company trucks used on maintenance operations and repair of pipe lines have been held by the Office of Defense Transportation to be entitled to classification with trucks employed by a public utility and not subject to the requirement of ODT Order 6 that mileage of trucks be reduced by 25 percent.

The ODT ruling was issued in response to a recommendation by OPC for exemption of such trucks from the order.

No action had been taken up to the end of the week on the status of trucks used in construction of pipe lines, but it was reported ODT is cognizant of the need for such trucks to operate practically on an unrestricted basis and will probably grant an exemption from the order.

☆

APPOINTMENT: Appointment of Walter P. Hedden of New Rochelle, N. Y., as consultant to Fayette B. Dow, director of the division of pipe lines, tankers, tank cars and tank trucks of the Office of Defense Transportation, was announced July 10 by Director Joseph B. Eastman.

Hedden, who has been associated with the Port of New York Authority for a number of years, has made studies of barge and other facilities for the movement of oil.

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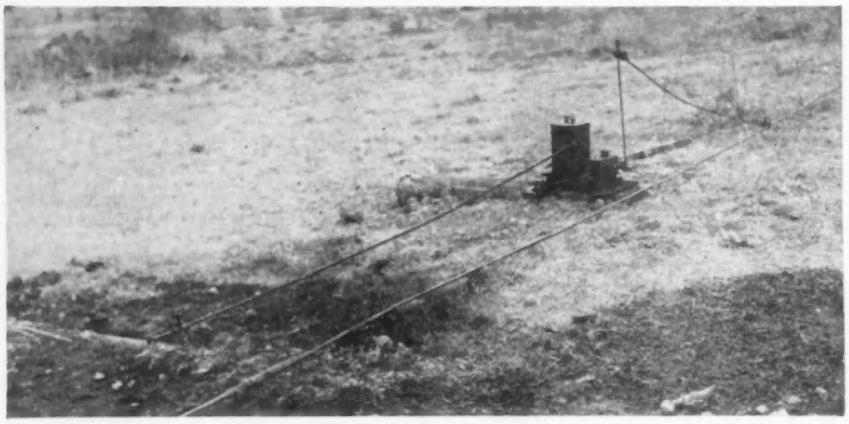
PRACTICAL OPERATING *Hints* FOR

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston."

1. TREATING

Rod-line Drive for Chemical Feed Unit



Clipping a pin to the rod with swivel bearing at point of attachment to pump arm permits infinite number of settings for feed of chemical from reservoir into flow line.

OFTEN it is advantageous to install mechanically-operated chemical injection pumps at points in the field where chemical may be fed to oil lead lines or gathering lines between the wells and the tank battery. Chemical injected at these points may augment that injected at the well, and may help to settle out much of the water before the fluid reaches the gun-barrel.

On properties pumped with a central power and jack lines, a simple method of injecting chemical may be employed. This consists of setting up the pump near the oil line, and at a point that will permit clamping a rod to any part of the jack line. By replacing the short rod normally accompanying the pump with a longer one, such as a 3-foot length of sucker rod, the connecting rod may be attached to the pump rod at any position to obtain various lengths of stroke. Stripper-well properties, producing less oil than the average of newer wells, do not require as much chemical, and the shorter stroke on the chemical pump is to be desired. A ½-inch chemical line is run from the pump over to the oil line.

An advantage of this type of set-up is that it is inexpensive to install. In most cases, all that is necessary is a timber or other simple base on which to set the pump, using lag screws or bolts. Because of this feature, a unit may be shifted to different points in the gathering line system in order to find the optimum location at which the chemical has the greatest effect on reducing emulsions.

2. CONTROLS

Bypass Gives Dual Firing for Heater

TO PERMIT manual control of the fuel to a treating unit heater in addition to the usual thermostatic regulation, one company cuts two extra tees into the fuel line to the burner, one on either side of the regulator.

By means of blanking gates in the line, it is possible to cut off the regulator and fire by hand settings, while the regulator may be removed for servicing simply by breaking one union and swinging its feed line slightly to one side.

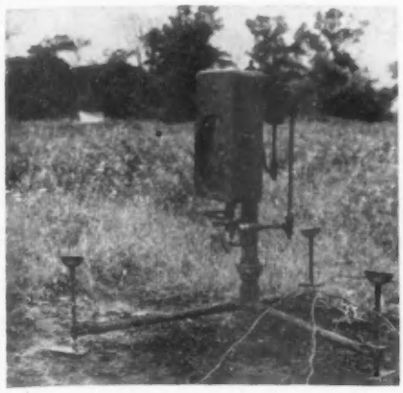
A screen, set just ahead of the regulator to clean the fuel oil is provided with a blow-down leg instead of the usual cleanout plug. The length of nipple between screen and valve acts as sump and trap for sediment, all of which may be blown out under fuel line pressure simply by cracking the gate, and without shutting off feed to the burners.

Splitting the fuel line to heater, with block valves in each branch, permits manual control in case of automatic failure, and enables regulator to be serviced without stopping unit.

THE PRODUCTION MAN

3. METERING

Adjustable Tripod on Portable Test Set



Equipped with long adjusting screws in extended arms, this meter is quickly leveled for field testing.

SETTING of a portable test meter was greatly speeded up by construction of an adjustable mounting which eliminated much of the blocking and shimming usually required.

Base of the unit was formed from a 2-inch collar, to which were welded three horizontal supports of 1-inch pipe. The outer ends of these pipes were welded solid, tapped and long adjustable levelling screws, each fitted with lock nut, run through them. The lower ends of these screws were made cone-shaped, the tops fitted with wing nuts, welded in place, to facilitate adjustment.

A short nipple above the collar carried a standard ground-joint union, above which was mounted the recording meter. The union provided for demounting the meter for servicing, and also for orienting when it was not possible to set the extended supports so as to provide the desired visibility or access to charts and pens.

4. TRANSPORTATION

Special Trailer for Extended Equipment

OIL field hauling of sand pumps, bailers, and if necessary, several miscellaneous lengths of rods or tubing, is simply and easily done by the field maintenance crew of one company with the aid of a specially-rigged combination tool box and trailer.

The steel tool box is made up into two sections, set back to back, and with a gap of some 18 inches between the two. Welded to the trailer bed between the boxes are two cradles made of two split sections of casing which serve to hold the bailers in place while being moved.

A specially made steel support for the front end of the tow bar also contains two similar, though short, cradles, and also serves to hold the trailer in a horizontal position while it is set up on the job. Light chains at several points about the trailer are used to lash the equipment to the frame while on longer trips about the field.

Long towing pole carries saddles on which bailers and other extended units may be carried, while compact tool-box built over axle transports shorter and smaller units for servicing.

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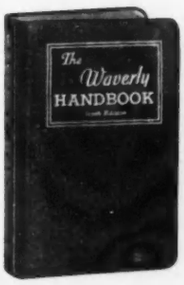

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The Week's News

Texas Hearing July 20 to Get Formal Demand Figures

The Texas Railroad Commission has set a statewide proration hearing for July 20, at Austin. For the first time the commission will obtain information on nominations as the result of an order, rather than on the voluntary basis.

The new order calling for nominations from all purchasers of crude oil required that the first report be in the offices of the commission on July 10. This will give clerks an opportunity to check for duplications during the 10 days preceding the hearing.

It is possible that the commission may make some attempt to curtail production of distillate and condensate in August, despite the voluntary reduction made by some of the plants during the past few months.

Some attorneys are of the opinion that the commission may be able to prorate this production on the waste basis because the rate of production is high enough in some fields to cause pressure to decline at an excessive rate. Under this theory, it would of course be necessary to determine whether the field is water-driven and what rate is proper.

It is more probable that such curtailment would be based on market demand primarily. That is, on the theory that because condensate or distillate production absorbs so much of the market which would go to other grades of crude normally, wells in these other fields might be abandoned prematurely.

Two Oklahoma Fields Given Increased Output

Ed Cox and Wildcat Jim fields, Carter County, Oklahoma, gained increased output July 10. Prior to the new order, operators had been held to 5 barrels per well per day as required by demand. The demand having increased beyond this figure Shell Oil Company, with pipe-line connections to both fields, will now take an additional 1000 barrels per day from the two fields.

Oil from the area is low gravity, being used principally for fuel oil. Prices range from 84 to 90 cents per barrel.

Illinois Meeting Will Fix Regulations for Drilling

Illinois oil and coal operators have been summoned by G. C. Curtis, superintendent of the state division of oil and gas conservation, to a public meeting on July 16 to consider adoption of new rules and regulations governing drilling, operating and plugging of wells.

A committee of oil operators, coal mining companies, the state mining board and representatives of the state geological survey and the oil and gas division have been working on a draft of a new set of rules and regulations, adoption of which was authorized by the last session of the Illinois general assembly.

Curtis said adoption of more stringent rules regulating the drilling and plugging of wells has become necessary as development in the Illinois basin has increased and spread to new areas.

He asserted the new rules will take into consideration the preservation of coal seams and oil, gas and water horizons, and will impose upon oil operators certain drilling procedures in areas where coal is present.

Restore Two Mexican Properties on Technicality

In a decision which is not expected to have material bearing on the still uncertain outcome of negotiations between the American and Mexican governments to compensate American oil companies for Mexican properties expropriated in 1938, the Mexican supreme court last week ruled the government had no right to seize two properties of Standard Oil Company (New Jersey) subsidiaries totaling 1,500,000 acres. Reversing a lower court decision the supreme court unanimously ordered that the properties held through concessions granted Mercedes Petroleum Company and Titania Petroleum Company be returned to the parent organization.

The supreme court upheld the parent company's contention that the two subsidiaries were not named in the Mexican government's expropriation decree of March 18, 1938, and that their holdings were therefore improperly taken under that decree. The government had argued that failure to name the subsidiaries was immaterial for the reason they were subsidiaries of Huasteca Petroleum Company, which was named in the expropriation decree and which is another subsidiary of Standard Oil Company (New Jersey). This argument was rejected by the supreme court.

The Mercedes and Titania property lies in northern Tamaulipas and was contracted in 1926 and 1927. Neither of the two tracts was producing oil at the time of seizure in 1938.

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Big Oil Refinery-Rubber Plant for South Louisiana

Construction of a refining plant in the Louisiana coastal area to cost in excess of $50,000,000 is in the contract stage. Part of its output will be butadiene and styrene, as well as 100-octane aviation gasoline. A rubber compounding plant will be operated adjacent to the refining unit.

This will be the first unit of the synthetic rubber program to be built as a new venture. Previously the units for butadiene and stryene have been predicated on existing refining capacity as a source of raw material for these petroleum hydrocarbons.

Cities Service Oil Company and other companies have combined to operate the large plant, which will be located in an area where ample butane is available from natural gasoline and cycling plants.

California Classifies Pools In Determining Flow Rates

Seventeen pools have been added to the list exempted from restriction on oil production in the California allocation schedule for July submitted by the Production Committee for District No. 5 to the Office of Petroleum Coordinator for approval, making a total of 143 such pools.

These exemptions are based upon a new segregation of pools into those in which capacity production would not reduce ultimate recovery of oil from the pool, as against those in which wide-open operation would lower ultimate recovery, this determination having been made from a study and evaluation of production characteristics of the pools by the Engineering Subcommittee of the Production Committee.

Pools now are divided into six classes: Ia, b, and c, and IIa, b, and c. Pools in the "I" class are those in which capacity production would result in reduction of ultimate recovery, and those in the "II" class are those in which no damage to the pool would result from unrestricted output. The subdivisions in each class indicate gradations of effect of unrestricted production upon ultimate recovery, as well as progressive stages of depletion, relative average well size, and utilization of present equipment. For example, it would be more damaging to ultimate recovery to produce a Ia pool to capacity than it would to produce a Ic pool to capacity, and exemption of IIc and b pools utilizes present equipment where rate of availability is low while reserving for future emergencies the flowing production of the undepleted pools.

Basis for these classifications is the percentage of depletion of the pool. As depletion of the pool progresses, it grades from the "I" classification and its sub classifications into the "II" classifications and its sub classifications. Thus a Ia pool is a relatively undepleted flowing pool, and a IIc pool is a marginal area, usually in the extreme stages of depletion with a producing capacity not materially in excess of the economic minimum necessary to maintain conti-

nuity of production, the other gradations falling between these two extremes.

With pools thus classified, the additional volume of producing capacity exempted from restriction in July as compared with June is estimated at 65,620 barrels per day, resulting in a net increase of 11,434 barrels per day in allotment. The total California production quota for July, as certified by the Petroleum Coordinator, is 739,500 barrels per day, including crude oil, natural gasoline, liquefied petroleum gases, and condensate. Out of this total, net crude requirements are estimated by the Production Committee to be 699,400 barrels, of which 3320 barrels per day is reserved for wells to be completed during July, leaving 698 080 barrels allocated to producing wells as of the first of the month.

Houdry Process Claims Short Cut to Rubber

Further confusion in the petroleum industry's part of the synthetic rubber program came last week with claims of the Houdry Process Corporation that one of its catalytic processes can produce butadiene cheaper and quicker than any other petroleum process. Whether the process in question is the process now operating more than 150,000 barrels of daily refining capacity or some newer catalyst was not made public.

Eugene J. Houdry, inventor of the process, in a statement to the press said it was a stationary catalyst. A pilot plant of 40 pounds of butadiene daily is in operation. Sun Oil Company was listed as having applied for permission to build a commercial unit and has had no report from Rubber Reserve Company. Standard Oil Company of California was said to have recommended the process for its part in the butadiene program. The process is credited with ability to produce styrene, and Socony-Vacuum Oil Company has made application for building a unit for that purpose.

Whether the process will make butadiene direct or go through stages of dehydrogenation from butane to butylene to butadiene was not made clear. The original procedure called for the two steps of dehydrogenation to arrive at butadiene. Recently Standard Oil Development Company has announced that its moving catalytic cracking process can be so operated that it will produce butylene and thus leave but one step in dehydrogenation to make butadiene and several of the units being built are being redesigned for that method of operation.

In his statement Houdry said that 15 of his units could produce the 750,000 tons of butadiene, essential to the production of 1,000,000 tons of synthetic rubber, that the 15 plants could be built with one third to one half the amount of steel essential to any other petroleum process, that the plants could be built in nine months if given adequate priorities of steel and labor, a saving of four months over other petroleum processes and equal the time to build plants for butadiene production from grain sources.

JIM McCLUNG, scout for Magnolia Petroleum Company at Shreveport, has reported for military service, and is succeeded by Charles C. Bryans, former assistant chief scout at Dallas.

Survey Crews Busy On Big-Inch Line

Survey of the right-of-way of War Emergency Pipe Line, Inc.'s 24-inch trunk line from the East Texas field to terminals in Illinois and Indiana is underway. A. N. Horne, former manager of Empire Pipe Line Company, Bartlesville, and now on active duty as a major in the Army, is supervising this work with headquarters at Little Rock Arkansas. The carrier is scheduled to originate in the Avery Johnson Survey, Gregg County, being east of the East Texas field and several miles southeast of Longview. Considerable steel tankage is held by participating pipe line companies in the general area, and the bulk of this storage will be available.

Contract for the manufacture of the pipe is held by one of the largest pipe mills, but deliveries of pipe will not begin until the right-of-way is obtained. Experienced buyers that have been engaged on interstate pipe line projects are standing by for orders to proceed with the purchase of the right-of-way.

This government financed project will transport high-gravity crude and refined products, with a substantial portion of the latter to be supplied by feeder lines from refineries in the Houston-Beaumont district. Movement of fuel oil during cold weather will not be undertaken as this low viscosity material will lower the capacity of the carrier to about 100,000 barrels daily.

Texas Loops Provide Two-Way Pumping Line

Approval of The Texas Pipe Line Company's request for authority to insert 3 loops, aggregating 110 miles of 8- and 10-inch pipe, into its Mid-Continent system between North Dallas and Stuart, Oklahoma (see page 11), will provide the company with two complete units that will pump north and south simultaneously. The company's system, extending north from Corsicana to Stuart, has been tied up for some months in moving East Texas field crude and also North Texas sweet oil on consignment to The Texas-Empire Pipe Line Company's Middlewest system. In the meantime its Oklahoma City crude and oils from other nearby fields that yield lube stocks and other essential products of military value have been backed up awaiting opportunity to pump south to The Texas Company's Port Arthur refinery.

Approximately 70 miles of the 8-inch needed for the above loops will be gained through the salvaging of The Texas Pipe Line Company's Panhandle-Electra line between Childress and Electra. The remainder of the line is delivering Panhandle gas to an electric plant near Childress.

Humble Taking Up 25 Miles of 10-Inch Pipe

Humble Pipe Line Company has discontinued operations in the Van Field, East Texas, and is removing 25 miles of 10-inch welded line extending east from Van to Hawkins junction, where the original 94-mile carrier to the Louisiana border will continue to serve the Hawkins field. The Van outlet was placed in service December, 1930, and since October, 1936, a substantial portion of the crude deliveries to Louisiana has involved asphalt oils from Talco and Sulphur Bluff fields, using, an extension from Longview junction. Humble has turned its Van field gathering system to Pure Transportation Company, which operates a 10-inch line to Smiths Bluff.

Gas Line Building From Missouri Field

Tiger Oil & Pipe Line Company reports it is completing arrangements for construction of 38 miles of 12-inch gas line from Polo field, Caldwell County, Missouri, to a Cities Service Oil Company connection at Independence. Polo field, discovered in 1940, produces from shallow sands of Pennsylvanian age. Total openflow of the field has been gauged at 35,000,000 cubic feet, from the 16 producing wells. Work is scheduled to start immediately.

Enlarging Gas Storage Facilities in Ohio

East Ohio Gas Company is enlarging its natural gas storage capacity by about 75 percent and will build additional pipe line capacity in an expansion program designed to meet anticipated heavy demands next winter from war plants in northeastern Ohio.

Near the company's present natural gas liquefaction plant at Cleveland, which can store 150,000,000 cubic feet of gas in liquid form, additional capacity to store 100,000,000 cubic feet will be installed. The gas will be used to meet peak load requirements of northeastern Ohio towns. New pipe line construction will enlarge the company's capacity to bring natural gas from Stark and Tuscarawas counties to a control station near North Canton, Ohio.

Kansas Lease Deal

Atlantic Refining Company has acquired the producing properties of S. A. Yarnell and Lawrence Spencer, Wichita operators, in Bloomer field, Barton and Ellsworth counties, Kansas. The deal involves 25 wells, 4 producing from Lansing-Kansas City lime and 21 from Arbuckle lime. Consideration was slightly less than $1,000,000.

Swedish Wildcat Resumes Drilling

A wildcat well subsidized with the grant of 410,000 crowns from the government will resume drilling next month at Hollviken in southern Sweden after being suspended last December, according to Swedish sources. The test was suspended because of lack of equipment at 3640 feet. Expectation is that oil will be found at around 5400 feet.

Drilling is scheduled to go to 6560 feet in order to study strata beneath those known to exist, and is expected to require about 8 months. The Swedish government is subsidizing the test in hope of augmenting the country's small annual output of oil from shale. The shale oil industry also is receiving government support.

Colombian Test Fails

McCarthy 1, a test on Carare Petroleum Company's concession on the east bank of the Magdalena river in the middle valley region, has been abandoned at 5420 feet. The hole is across the river from Richmond Petroleum Company's Culimba 1, which was abandoned last December.

Burning Oils Continue Falling Short of Demand

The United States supply of heavy fuel oil continued to be critical, as additional drafts on above-ground stores of this product were made the week ended July 4. Meanwhile, there was little improvement in light fuel oil stocks as less than normal seasonal additions were made and consequently the volume in storage fell further behind the 1941 level. On the favorable side of the picture was the continued reduction in gasoline stocks.

Inventories of residual fuel oil after the withdrawal of 401,000 barrels during the week ended July 4 totaled 76,903,000 barrels. At this level they were 14,032,000 barrels, or 15.4 percent, under a year ago. The major reduction in heavy fuel stocks continued to occur in California, which following a 358,000-barrel weekly draft totaled only 54,478,000 barrels. Over 8,000,000 barrels of heavy fuel oil have been withdrawn from California storage since the first of the year.

The nation's light fuel oil inventories increased 669,000 barrels to 33,520,000 barrels, but due to this growth being below the rate of gain that existed in 1941 now are 14 percent less than a year ago while only a week ago 13.1 percent behind last year. Practically all areas showed minor additions to gas oil and distillate fuel stocks the past week.

The draft on gasoline stocks amounted to 1,382,000 barrels during the week, which is about normal despite rationing and curtailed driving and was due to continued small volume of crude runs to stills. Gasoline stocks on July 4 totaled 87,014,000 barrels, 1,695,000 barrels or 1.9 percent under a year ago.

Petroleum Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels)

STATE OR DISTRICT	[1]OPC Allocation in July	PRODUCTION IN WEEK ENDED July 4	July 11
Arkansas	78,500	73,750	74,150
California	739,500	622,600	684,800
Long Beach		36,400	36,200
Midway-Sunset		53,200	57,100
Kettleman Hills		33,100	39,200
Wilmington		90,300	92,300
Rest of State		409,600	460,000
Colorado	7,700	6,700	6,650
Illinois	304,100	277,150	283,150
Salem		41,750	42,650
Louden		48,350	48,300
Other New Pools		171,800	179,050
Old Pools		15,250	13,150
Indiana	22,000	18,700	18,750
Kansas	283,200	269,300	271,150
Kentucky	14,100	9,750	12,700
Louisiana	319,600	309,250	313,500
North Louisiana		90,800	91,400
South Louisiana		218,450	222,100
Michigan	64,800	65,600	67,000
Mississippi	49,900	83,400	84,900
Missouri		130	130
Montana	23,100	23,250	21,300
Nebraska	4,100	3,700	3,750
New Mexico	80,500	76,650	76,650
New York	15,300	13,350	14,050
Ohio	11,300	9,800	10,000
Oklahoma	433,000	373,700	372,000
Oklahoma City		72,850	70,400
Seminole Area		94,000	92,800
Rest of State		206,850	208,800
Pennsylvania	54,100	52,550	53,650
Tennessee		30	30
Texas	[2]1,214,400	924,000	1,204,450
Upper Gulf Coast		172,150	251,500
East Texas Field		217,700	290,350
Rest of Eastern Texas		74,150	85,050
Lower Gulf Coast		53,650	85,650
Southwest Texas		29,550	45,650
South Central Texas		15,500	15,750
West Texas		138,800	207,500
North Texas		142,750	142,450
Panhandle		79,750	80,550
Utah		15	15
West Virginia	17,800	9,550	9,250
Wyoming	96,800	92,250	93,250
Total United States	3,833,800	3,315,175	3,675,275

[1] Production rates recommended for states by Office of Petroleum Coordinator, on basis of Bureau of Mines forecast of the nation's daily average requirements for domestic crude during month. State conservation authorities except Texas Railroad Commission have prescribed allowables calculated to hold actual production within OPC regulations. (Details on state allowables published in The Oil Weekly of July 6, page 43.)

[2] Actual production of crude oil and other petroleum liquids in Texas expected to average 1,209,482 barrels daily, under railroad commission order, taking into consideration shutdowns in most fields of July 4, 5, 11, 12, 18, 19, 25, 26, 29, 30 and 31. East Texas fields will be shut down on these days and also on July 6, 13 and 20.

U. S. Crude Output Rises To 3,675,275 Barrels Day

United States crude oil production during the week ended July 11 rose 360,120 barrels daily from the level of the previous week, averaging 3,675,275 barrels per day.

The increase was due to fewer shutdown producing days in Texas and resulting gain in output of this state. Texas production averaged 1,204,450 barrels the past week in comparison with 924,000 barrels the preceding week.

California production also was higher by a substantial margin, averaging 684,800 barrels daily in contrast with 622,600 barrels for the week ended July 4.

The declining output of Illinois reversed itself, due to output of newly discovered fields. The past week this state produced 283,150 barrels per day, compared with 277,150 barrels the previous week.

Illinois Production Declined in June

Illinois oil production during June totalled 8,429,000 barrels, a decrease of 693,000 barrels from the previous month, monthly drilling report of the state geological survey division showed July 9. Last month's production brought the total for the first 6 months of the year to 57,994,000 barrels, compared with 60,954,000 barrels in the corresponding period of 1941.

Seventy-two oil wells and two gas wells were completed and three new pools were discovered in Illinois during June, the report said.

On the last day of June 10,991 wells were yielding oil or gas in the state. Of these, 491 have been completed since the beginning of the year.

Texas Producers Pay State Over 10 Cents Per Barrel

Texas oil producers paid an average of 10-1/3 cents per barrel in state and local taxes on every barrel of oil they produced last year.

That is the figure found by the Texas Mid-Continent Oil and Gas Association in its annual tax survey of producing taxes in all oil counties of the state. It compares with 9.02 cents per barrel average in 1940.

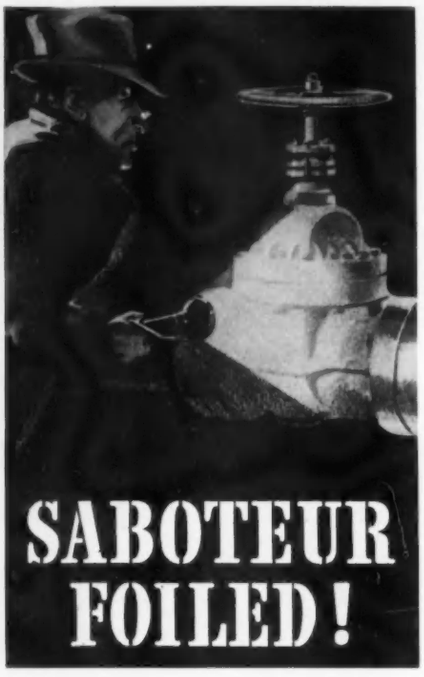
The 1941 taxes were made up of 5 months at the old rates and 7 months of the increased levies imposed by the omnibus tax bill. The increased rates have, of course, been in effect all during 1942, bringing the average now to probably over 11 cents per barrel. Contributing to this increase in the per-barrel average has been the drop in pro-

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[1]4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	[1]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,357	1- 3	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-21	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	80,870	10- 4	28,381	4-12	92,635	7- 5
1942	3,297	7- 4	3,393	5-23	244,364	1-10	87,014	7- 4	29,240	4-25	76,903	7- 4
Trends in 1942 (Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29,240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 6	3,602	.....	3,451	.....	254,316	.....	93,305	.....	31,535	.....	79,556	.....
June 13	3,700	.....	3,478	.....	253,386	.....	91,994	.....	31,276	.....	78,759	.....
June 20	3,721	.....	3,434	.....	252,748	.....	89,847	.....	32,244	.....	78,318	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,304	.....
July 4, 1942	3,297	.....	3,551	.....	.....	.....	87,014	.....	33,520	.....	76,903	.....
July 5, 1941	3,658	.....	3,766	.....	[4]259,399	.....	88,709	.....	39,008	.....	90,935	.....
Change:												
In week	—422	.....	—30	.....	+616	.....	—1,382	.....	+669	.....	—401	.....
In year	—361	.....	—215	.....	—6,035	.....	—1,695	.....	—5,488	.....	—14,032	.....
In year	—9.8%	.....	—5.7%	.....	—2.3%	.....	—1.9%	.....	—14.0%	.....	—15.4%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Stocks, June 28, 1941.



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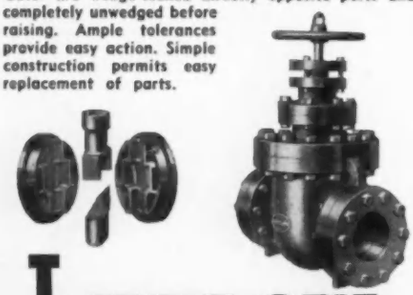

LUDLOW VALVES

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duction while advalorem and some other levies remained constant.

The total paid by Texas oil producers in state and local taxes last year was $51,782,116. This is on oil production alone, and does not include taxes on refining, marketing or transportation, or gas production. It does not include federal taxes, which would bring the total paid by Texas oil producers considerably higher.

Based on Texas oil production of 501,826,516 barrels as reported for the calendar year 1941 by the State comptroller, the Texas Mid-Continent's study showed taxes on oil producers as follows:

Tax	Total	Per Barrel
Advalorem (state and local)	$24,648,884	$.0491
Gross Production	20,285,711	.0404
Regulatory	940,925	.0019
Gross receipts	1,711,875	.0034
Franchise	691,496	.0014
Other state	3,503,225	.0070
Total	$51,782,116	.1032

Jersey Company Makes New Approach in Report

In a report to the 49,319 domestic employes of Standard Oil Company (N. J.) and its subsidiaries entitled, "Our Business in War Time," W. S. Farish, president of the company, carries the 1941 record of the annual report to stockholders into the present year "in order to relate it to the great war effort to which the country has dedicated all its vast resources." The following are some of the highlights of the report and consist of figures which have not been published previously.

Since 1935 the company has spent a total of $113,850,000 of its own funds on the construction of plants for the manufacture of 100-octane aviation fuel, including units scheduled for completion in 1942 and 1943. Eighty percent of the toluol for military explosives will come from plants using Jersey perfected processes.

Between 1937 and 1941 the company spent $2,480,900 on research and development work in synthetic rubbers, and $12,000,000 on plant construction, a total of $14,480,900.

In listing its emergency overland shipments of oil and products the company revealed that up to the end of May its tank car shipments to the East were averaging 131,000 barrels per day, an increase of 370 percent over the same period last year. Barge shipments were averaging 2500 barrels a month, a rise of 400 percent. And transportation by pipe line was averaging 45,489 barrels per day or an upward movement of 647 percent.

The company's domestic payroll last year totaled $121,461,000. Of this, employes paid $11,873,000 out of their earnings for various security purposes and the company contributed $18,258,000 for sickness, accident and death benefits and social security. The total devoted to financial security from both of these sources averaged $610 per employe last year, 14 percent more than in 1940.

Seventeen hundred of Standard's domestic employees are in the armed forces. This report also shows a Treasury Department certificate indicating that over 90 percent of the parent company's employes are purchasing war bonds through the payroll deduction plan. Other subsidiaries are said to have already passed or be rapidly approaching this figure.

There is a new approach to the problem of taxes this year, the company pointing with pride to the largest tax bill in its history and illustrating the number of tanks, pursuit planes and other pieces of armament which might have been purchased with them. The company's direct taxes per domestic employe average $2,324, or $6.37 a day for each man or woman on the payroll.

The report divides stockholders into percentage groups according to the number of shares they own, and reveals that 93,144 stockholders, or nearly 65 percent, own less than 50 shares.

Industry Again Called Upon to "Get in the Scrap"

Emphasis on oil industry iron and steel scrap collection, dormant during the industry's functioning as collection centers for the scrap rubber drive, is due to be resumed today when advertising campaigns, Washington announcements, and inter-company momoranda mark the outset of a renewed and intensified campaign to get in more scrap.

Thus the industry is again to be relied upon to furnish much of the steel scrap backlog which must be accumulated during the next 90 days if the furnaces are to continue to meet steel demands this winter.

There is much scrap still available on oil properties short of that which must be deliberately made by wrecking derricks or exhuming old pipe lines. It does not exist in the large piles and extensive dumps which furnished much of the metal turned in during that earlier campaign which so effectively filled the gap in materials consequent to the conversion of the automobile industry to war materials; but much steel may yet be accumulated if it be sought for.

Pipe-line and other maintenance gangs, cutting right-of-way and performing the usual summer reconditioning, may be made active agencies in swelling the recovered totals if they be coached to watch for scrap during their day's work, and encouraged to take the necessary time and exert the necessary effort to bring the scattered scrap to the gang truck, and thence to the company warehouse or other centralized shipping point.

Still more scrap may be made available by a reclassification of much junk material held as possible raw material for rebuilding or reclamation work. If this work be assigned some member of the organization not too closely associated normally with the material to be inspected, much "frozen" material should be thawed and made available for a far more important part in war effort than could possibly accrue to it in a stock pile against possible use.

Company employes, given the necessary authority to proceed, already have dug up and added to the national scrap pile short sections of abandoned pipe lines, doing the work on their own time and after company working hours. This plan, expanded, should bring in additional material from places where press of company work precludes the possibility of such service to the scrap campaign being contributed during normal working hours.

The oil industry has always been noted for its ability to find a way and get the job done: it will not fail to carry more than its share in the campaign now being undertaken.

U. S. Field Operations

Illinois Basin

Hamilton County Wildcat Has Good Saturation

Hamilton County wildcat finds good saturation in Aux Vases sand. Casing set at Williamson County wildcat. Jefferson County wildcat swabs oil and water in brief test. Several large producers near completion in new Jeff pool of Wayne County. White County wildcat on pump for production test.

Hamilton County: Ohio Oil Co.'s Moore 1, NE SE NW 35-6s-5e, two miles south of Rural Hill field, drilling plug on Aux Vases 3296-3301 and 3303-09 ft which yielded 2080 ft of oil and 60 ft of oily mud in a 65-minute drill-stem test. Ele. 585 ft, Glen Dean 2112 ft, 7-in at 3286 ft.

Williamson County: Joe Blalack's Andrus 1, NW SE 9-9s-2e, 3 miles northwest of Marion and 17 miles from production, set 7-in at 1750 through Tar Springs at 1685-95 ft.

Jefferson County: Oil Carriers' Starr Brothers 1, 2½ miles southeast of Bluford, C N½ SW SW 1-3s-4e, swabbed 30 bbls of oil and 40 bbls of water in 2 hours after 500 gallons of acid in Lower O'Hara at 3076-86 ft; being put on pump but if production is not satisfactory will test a show in McClosky.

Texas Co.'s Crouch 1, SW SW SE 16-3s-3e, mile north of production, drilling 3226, a Devonian test.

Wayne County: In new Jeff pool west of Fairfield, Deep Rock's John Sanford 1, SW NE 30-1s-7e, flowed 287 bbls of oil in 10 hrs after 2000-gallon acid treatment in McClosky at 3235-48 ft; is south offset to discovery well. Gulf Refining Co.'s Blackburn 2, SE SE 19-1s-7e, flowed 880 bbls natural in 24 hrs from McClosky, 3250 ft. R. L. Bauman-Kewanee Oil Co.'s Sanford-Beck 1, C NW NW 29-1s-7e, swabbed 125 bbls a day from Lower O'Hara at 3212-19 ft after 1000 gallons of acid for first O'Hara producer in field.

Gallatin County: Murphy Oil Co.'s Spence 1, C N½ NE NW 33-7s-9e, abandoned at 3150 ft after testing shows in Cypress and Tar Springs.

Sinclair-Wyoming's Cox 1, SW SW SW 24-7s-8e, abandoned at 3083 ft, after testing Cypress at 2523-50 ft.

ILLINOIS FIELD COMPLETIONS

Clay County—Goodson & Martin's Nash 1, ce½ nw se 12-3n-6e, abnd 3007 ft.

Clinton County—Texas Co.'s Grey Comm. 5, sw se nw 35-3n-2w, Beth 1202-28 ft, 217 bbls, 1230 ft.

Fayette County—H. Luttrell et al's Hollman 2, se ne sw 30-5n-3e, Ben 1908-1913 ft, 15 bbls, 1916 ft.

Gallatin County—Skelly's Hoge 1, se nw se 15-8s-9e, abnd 2990 ft.

Phillips' Egy. T&T 8, sw ne ne 16-8s-10e, Pal 1838-48 ft, pb 1850 ft, 18 bbls, 2089 ft.

Carter's Jordan 2, ne se ne 21-8s-10e, abnd 2908 ft.

Skelly's Egy T&T 1, ne nw ne 21-8s-10w, Walts 1979-2002 ft, 210 bbls, 2002 ft.

Hamilton County—Ford et al's Anderson 1, sw nw ne 11-6s-6e, abnd 3254 ft.

Texas & Gulf's Henderson et al 1, nw sw se 18-6s-6e, AV 3065-74 ft, 450 bbls, 3092 ft.

Texas Co.'s Hall A-3, ne ne nw 18-6s-6e, AV 3113-40 ft, McC 3196-3243 ft, 167 bbls, 3325 ft.

Texas Co.'s Logan 2, nw nw sw 31-5s-7e, abnd 3063 ft.

Jasper County—Pure's Cunningham A-1, ne sw 5-5n-10e, 140 bbls, 2827 ft.

R. R. Powers' Harvey 1, ce½ sw nw 7-5n-10e, McC 2853-62 ft, 196 bbls, 2863 ft.

Results on Industry's Prospecting Fronts

Eight new oil producing spots were added during the week with completion of 81 wildcat wells. Total for the year is 211 oil strikes out of 1567 wildcats completed.

Michigan: Two pools get wide extensions.

North Louisiana: Concordia Parish strike gauges 136 barrels daily.

Louisiana Coast: New field opened and important Sparta strike at Pine Prairie.

Texas Coast: Two new fields.

North Texas: Mile extension for Hoefle.

West Texas: Bill well extends Sand Hills.

Shulman Bros.' King 1, ce½ se sw 7-5n-10e, McC 2843-45 and 2869-73 ft, 200 bbls, 2878 ft.

Lawrence County—W. E. Bailor's Cunningham 1, se se se 27-2n-12w, Beth 2004-16 ft, 169 bbls, 2016 ft.

Madison County—M. D. Bryant et al's Becker 1, c nw se 16-3n-6w, Tren 2362-85 ft, 121 bbls, 2387 ft.

Richland County—Pure's Hoel A-1, cw½ nw ne 12-4n-9e, Weil 2636-40 ft, 27 bbls, 2640 ft.

Wayne County—Armstrong & Day's Edmiston-Ellis 1, 140 ft w of nw sw 17-1s-5e, abnd 2956 ft.

Harvey Sims' Malone 1, cw½ se se 27-1s-6e, abnd 3250 ft.

Gulf's Weber 3, cw½ ne sw 33-1s-6e, McC 3186-92 ft, 233 bbls, 3200 ft.

Weinert's Suycott Comm. 1, ce½ ne ne 11-2s-7e, McC 3316-3330 ft, 15 bbls, 3330 ft.

Texas Co.'s Scott 1, cn½ sw se 7-3s-6e, abnd 3375 ft.

White County—Longhorn Oil Co.'s Helm 29, ne sw nw se 22-3s-14w, Ben 2637-53 ft, Weil 2584-92 ft, 2505-11 ft, AV 2764-74 ft, 200 bbls, 2781 ft.

Carter's Edwards 1, sw nw 15-7s-8e, Walts 2187-99 ft, 242 bbls, 2200 ft.

ILLINOIS WILDCAT COMPLETIONS

Bond County: New Field—W. C. McBride's Jacobs 1, 57 ft n of se sw nw 31-4n-2w, Beth 1116-27 ft, 24 bbls, 2526 ft.

Clark County: Failure—C. R. Craft's Finney 1, cw½ nw nw 32-9n-14w, abnd 2691 ft.

Clay County: Failure—Carter's Walker 1, ne ne 4-2n-5e, abnd 3097 ft.

Clay County: New Field—Nat. Petro. Co.'s Hinterscher 1, nw se se 10-4n-8e, McC 3096-3102 ft, 5 bbls, 3129 ft.

Cumberland County: Failure—C. R. Craft et al's Imle 1, ne sw 7-10n-11e, abnd 2623 ft.

Effingham County Failure—A. H. Gibson's Campbell 1, nw nw 10-6n-5e, abnd 2544 ft.

C. N. Pearson et al's Wright 1, cs½ sw ne 27-6n-5e, abnd 2500 ft.

Ohio's Vogt 1, se ne ne 1-7n-5e, abnd 2629 ft.

Fayette County: Failure—Sinc.-Wyo.'s Murray 1, ne ne ne 31-4n-1w, abnd 1630 ft.

Jefferson County: Failure—Cameron Bros.' Heartenstine 1, nw ne ne 19-2s-3e, abnd 2776 ft.

Jefferson County: New Field—Lewis Prod. Co.'s State Game Pres. 1, sw sw se 21-3s-3e, AV 2735-40 ft, 50 bbls, 2762 ft.

Jefferson County: Failure—R. B. Martin's Threlkeld et al 1, sw sw ne 10-4s-2e, abnd 2831 ft.

Macoupin County: New Gas Field—W. R. Holmes' Graham-Kulenkemp 1, nw se sw 7-8n-8w, pay 314-320 ft, 150 MFG, 320 ft.

Marion County: New Gas Field—H. A. Hoffman's Wilson 1, nw ne 24-4n-3w, pay 1112-1120 ft, .5 MFG, 1124 ft.

Marion County: Failure—T. R. Buell et al's Robb 1, sw se nw 19-4n-3e, abnd 2169 ft.

Monroe County: Failure—W. Payne's Ehler 1, cw½ nw ne 24-1s-10w, abnd 1097 ft.

Saline County: Failure—Sinc.-Wyo.'s Garner 1, cw½ sw sw 26-7s-7e, abnd 3155 ft.

Washington County: Failure—H. Hubbard's Mozelwski 1, sw sw sw 15-3s-2w, abnd 1344 ft.

White County: New Field—Jarvin & Marcell, Inc.'c Spencer 2, cn½ nw sw 31-4s-11e, Pal 2052-59 ft, 30 bbls, 2120 ft.

White County: Failure—Sinc.-Wyo.'s Hoge 1, sw sw nw 7-7s-9e, abnd 2990 ft.

ILLINOIS WILDCAT STARTS

Bond County—H. J. Hensley's Bushenn 1, sw nw ne sw 30-5n-4w, dr.

Clark County—George F. Knieram et al's Phillips 1-B, sw nw ne ne 18-11n-14w, to drill to new depth.

Clinton County—John's Branthorst 2, ne se ne 3-1n-2w, lcn.

Gallatin County—Carter's Crawford 1, ne se nw 11-8s-10e, dr.

Hamilton County—Carter's Leslie 1, se se 11-5s-5e, lcn.

Jasper County—Sinclair-Wyoming's Cook 1, ce½ ne se 4-5n-8e, lcn.

U. S. Drilling Operations in Week Ended July 11, 1942

STATE	ALL WELLS COMPLETED THIS WEEK Total	Oil	Gas	Dry	*Miscel.	Total 1942	Total this Date 1941	WILDCATS COMPLETED‡ THIS WEEK Total	Oil	Gas	Dry	Distillate	Total 1942
Alabama	....	....	....	....	....	3	1	....	....	....	....	....	3
Arkansas	2	2	....	....	....	71	85	....	....	....	....	....	7
California	12	5	1	6	....	377	585	6	....	....	6	....	25
Colorado	....	....	....	....	....	5	9	....	....	....	....	....	....
Georgia	....	....	....	....	....	2	1	....	....	....	....	....	2
Illinois	44	20	2	22	....	976	1,836	20	4	2	14	....	272
Indiana	11	1	1	9	....	208	280	9	1	1	7	....	42
Iowa	....	....	....	....	....	....	2	....	....	....	....	....	....
Kansas	35	17	2	15	1	855	1,140	5	....	....	5	....	199
Kentucky	3	1	....	2	....	78	155	2	....	....	2	....	17
Louisiana	22	17	1	4	....	560	731	5	1	1	3	....	85
Michigan	16	4	5	7	....	368	423	3	....	....	3	....	90
Mississippi	....	....	....	....	....	67	89	....	....	....	....	....	17
Missouri	....	....	....	....	....	15	36	....	....	....	....	....	....
Montana	....	....	....	....	....	88	109	....	....	....	....	....	....
Nebraska	1	....	....	1	....	26	42	1	....	....	1	....	12
New Mexico	6	4	....	1	1	215	183	2	1	....	1	....	15
New York	24	13	....	....	11	622	443	....	....	....	....	....	1
Ohio	21	5	11	5	....	582	866	....	....	....	....	....	....
Oklahoma	17	6	....	11	....	793	1,099	7	....	....	7	....	158
Pennsylvania	44	37	6	1	....	1,556	2,093	....	....	....	....	....	....
Tennessee	....	....	....	....	....	2	11	....	....	....	....	....	....
Texas	66	31	4	30	1	3,316	5,135	21	1	1	19	....	619
Virginia	....	....	....	....	....	1	....	....	....	....	....	....	....
West Virginia	12	4	6	2	....	373	354	....	....	....	....	....	....
Wyoming	....	....	....	....	....	42	61	....	....	....	....	....	3
Total this week	336	167	39	116	14	11,201	15,769	81	8	5	68	....	1,567
Total last week	340	193	28	100	19	10,805	15,091	64	10	....	54	....	1,468
Total this year	11,201	6,405	915	2,900	981	.....	.....	1,567	211	27	1,324	5	.....

* Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡ OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

Jefferson County—Texas Co.'s Williford 1, sw se ne 10-3s-3e, lcn.
Texas Co.'s Crouch 1, sw sw se 16-3s-3e, lcn.
R. B. Martin's Black 1, sw se ne 27-4s-2e, dr.
Wayne County—Pure's Michels "B" 1, se sw 26-2n-7e, dr.
White County—Skelly's Winters 1, sw nw ne 24-4s-9e, lcn.

INDIANA FIELD COMPLETIONS

Gibson County—J. W. Ginsburg's Steele 1, sw se sw 26-2s-9w, abnd 1250 ft.
Posey County—T. Lindas' Stephens 1, ne ne se 13-7s-13w, abnd 1204 ft.

INDIANA WILDCAT COMPLETIONS

Daviess County: Gas Field—R. D. Brown's McCracken C6, se ne se 16-2n-6w, Cyp 730 ft, 1,038 MCFG, 738½ ft.
Gibson County: New Field—McGinnis & Bittler's Michel 1, sw ne se 26-1s-10w, Hardn' sb, 1331-39 ft, 35 bbls, 1348 ft.
Gibson County: Failure—Milo Seigel's Armstrong 1, 68-1n-10w don, abnd 500 ft.
Pike County: Failure—Siosi Co.'s Enos Coal Co. 1, ne ne ne 18-1s-8w, abnd 1848 ft.
Pike County: Failure—Skelly's Sollman 1, sw se ne 14-3s-7w, abnd 1502 ft.
Posey County: Failure—Jarvis & Marcell's Walker 1, cen¼ nw se 33-6s-12w, abnd 2875 ft.
Posey County: Failure—Princeton Mining's Fee 1, cn¼ nw se 9-6s-10w, abnd 1000 ft.
Wabash County: Failure—Ohio's Mathew 1, sw sw nw 11-26n-6e, abnd 1060 ft.
Warrick County: Failure—V. S. Hollingsworth's Exell 1, ne sw se 36-6s-8w, abnd 1846 ft.

INDIANA WILDCAT STARTS

Fountain County—Fountain Oil Co.'s Glasscock 1, c se sw 2-18n-8w, drlg to new depths.
Pike County—Joe Dawson's Scales 1, nw ne ne 8-3s-7w, lcn.
Vanderburg County—H. K. Riddle's Hutchinson 1, nw nw ne 33-7s-11w, lcn.

KENTUCKY FIELD COMPLETION

Daviess County—Ed. Moran et al's Reid 1, 25-P-27, McC 2032-37 ft, 162 bbls, 2037 ft.

KENTUCKY WILDCAT COMPLETIONS

Daviess County: Failure—J. C. Miller's Massie 1, 2-P-28, abnd 1866 ft.
Ohio County: Failure—Wm. West's Godfrey Bennett 1, 24-M-32, abnd 883 ft.

KENTUCKY WILDCAT STARTS

McLean County—A. V. Smith et al's Bryant 1, 7-L-28, lcn.
Union County—Robert O'Meara's Waller 1, 12-P-18, lcn.

Oklahoma

Pauls Valley Edge Well Rated 325 Barrels Hour

Third well being brought in at East Watchorn; offset to Liberty discovery shows water; deeper section pays off in Houltke; west edge well at Pauls Valley.

Pottawatomie County: Stanolind's Bowling 1, NW SW NW 25-9-4e, Houltke field well originally completed in Hunton lime, became depleted in this zone and operator made additional hole to 4398 ft in dolomite. Here the well flowed 13 bbls per hr on test after a 1000-gal acid treatment. This gives the field four productive formations: Hunton, Viola, Wilcox and dolomite.

Garvin County: Mid-Continent's Campbell 1, SE SE NE 36-4n-1w, west offset to the discovery well of Pauls Valley field, Southern Oklahoma, came in to test 325 bbls in 1 hr through 5½-in casing. Tubing will be run and well tested through various chokes.

Noble County: The first offset to Deep Rock's Schultz 1, discovery of Liberty pool in Wilcox sand is the company's Schultz 2, SW SE SW 9-22-2e. The well filled 1000 ft with salt water on initial test from the sand although the hole is but a few feet lower on structure than the discovery which made 600 bbls in 3½ hrs with no water. Bottom is at 4529 ft. North of the discovery, Sunray Oil Co.'s Schultz 1, C NW SE 9-22-2e, drilled pay and cored saturated sand to 4532 ft.

Logan County: Gulf opened a stripper pool at Pulliam 1, C NE NE 20-16-4w, south of Crescent. Well drilled to dry Simpson at 7505 ft, plugged back to perforate Layton sand at 5224-50 ft, and completed for 58 bbls oil and 8 water.

Pawnee County: Producer at Alma Oil Co.'s Oldham Heirs 1, SWc 24-23-3e, north of the discovery of East Watchorn, swabbing and flowing 15 barrels per hour. The company's Swallow 1, west offset, tested for 650 bbls in 16 hrs. Swallow 1 is at 3926 ft in Wilcox; Heirs 1 at 3883 ft.

OKLAHOMA FIELD COMPLETIONS

Creek County: Hickory Grove—Malernee's Roundtree 2, sw sw 2-14n-7e, Bartl 3080 ft, flow 86 bbls, csg, 3148 ft.
Creek County: Semi-Wildcat—Superior Oil & Gas Co.'s Peerman 1, sw nw se 34-16n-7e, Wilcox 4050 ft, abnd 4090 ft.
Garvin County: Pauls Valley—Pure's Teter 4, se se nw 31-4n-1e, Bromide 4018 ft, flow 2630 bbls, 1 in, 4044 ft.
Marshall County: Isom Springs—E. J. Gill's Adams 4, ne se ne ne 6-8s-6e, sand 529 ft, pump 40 bbls oil, 2 water, 530 ft.
Muskogee County—W. B. Pine's Lacey & Stelle 1, se ne nw 24-13n-17e, Wilcox 2535 ft, abnd 2564 ft.
Osage County: Country Club—W. L. Martin's 1, sw nw sw 33-20n-12e, Bartl 1222 ft, abnd 1251 ft.
Pottawatomie County: West Earlsboro—Anderson-Prichard's White 3, sw nw 30-9n-5e, Hunton 4134 ft, pay 4128-38 ft, perf, 3000 gals acid, flow 209 bbls oil, 2 percent water, ⅛-in, 4200 ft.
Stephens County: Semi-Wildcat—L. Sikes' Johnson 1, cse nw 17-1n-8w, g wash 5055-5112 ft, abnd 5112 ft.
Stephens County: West Loco—O. L. Peck's P. H. Peck 1, sw ne ne 1-3s-6w, lime 1100-92 ft, sand 1192-1209 ft, flow 50 bbls, 1209 ft.

OKLAHOMA OLD WELLS DEEPENED

Seminole County: East Earlsboro—Gulf's Payne 11, sw sw se 18-9n-6e, otd 4265 ft, Wilcox 4243-91 ft, shot 60 qts, pump 64 bbls oil, 119 water, 4291 ft.

OKLAHOMA WILDCAT COMPLETIONS

Creek County: Failure—Tibbens Oil Co.'s Abraham 1, c nw ne 19-14n-9e, Layton 1258-71 ft, Osw 2286-94 ft, Prue 2369 ft, Bart 2805-62 ft, abnd 2862 ft.
Creek County: Failure—Lastecas Pet. Co.'s Jackson 1, c sw se 9-18n-9e, sand 1541-57 ft, sand 1628-58 ft, water, sandy shale 1665-72 ft, csg collapsed, junked, abnd 1695 ft.
Harmon County: Failure—Jordan Pet. Co.'s Hart 1, ne ne ne 24-5n-26w, lime 2982-3000 ft, perf 3190-3210 and 2982-95 ft, salt water, abnd 3510 ft.
Jackson County: Failure—Mutual Oil Co.'s Caves 1, se ne ne nw 36-4n-21w, wash 1070-95 ft, abnd 1764 ft.
Jackson County: Failure—James S. Smith's Mack 1, c nw ne nw 23-2n-20w, sand and granite wash 1337-42 ft, cored 1342-45 ft, dry sandy shale, cored 1345-50 ft, brn shale, cored 1453-60 ft, granite wash, shale, top lime 1891 ft, topped granite 2285 ft, abnd 2660 ft.
Kiowa County: Failure—Stauffer Pet. Co.'s Mayo 1, ne ne nw 13-6n-18w, shale 680-730 ft, abnd 1710 ft.
Stephens County: Failure—Louis Sikes' Johnson 1, c se nw 17-1n-8w, dry sand 2455-64 ft, sand and shale 2895-2910 ft, water sand 3017-25 ft, dry sand 3486-3525 ft, sand with stain 3584-92 ft, lime 4385 ft, Penn lime 4338 ft, slight show gas 4540-50 ft, granite wash 5055-5112 ft, abnd 5112 ft.

OKLAHOMA WILDCAT STARTS

Cleveland County—F. C. Hall et al's Means 1, c sw nw 33-6n-1e, cellar.
Harmon County—Gulf's Chaffin 1, c sw sw 25-1n-25w, lcn.
Kay County—Creekmore Rooney's Wentz 1, nw ne nw 8-27n-2e, dr 3705 ft.
Logan County—Continental et al's Bennett 1, se se se 14-17n-3e, lcn.
Love County—W. F. Turner's Fee 1, cs½ s½ 12-7s-2w, lcn.
Noble County—Morgan's Devore 1, nw nw sw 17-24n-1e, cellar.
English Drlg. Co.'s Franks 1, nw sw se 14-24n-1w, dr.
Pawnee County—McBride's Robedeaux 1, se sw sw 30-23n-3e, dr.
Lastecas' 1, sw sw nw 15-20n-5e, rig.
Payne County—T. E. Berru's Fee 1, ne se se 12-19n-4e, spud.
Pottawatomie County—Crosbie & Atlantic's Turner 1, ne nw sw 1-9n-4e, cellar.
Stanolind's Ratcliff 1, sw nw ne 10-10n-3e, spud.

NEBRASKA WILDCAT COMPLETION

Gage County: Failure—Don Linn's Scheideler 1, sw sw sw 14-1n-6e, Lansing 1423 ft, Hunton 1737 ft, St. Peter 2689 ft, granite wash 2747 ft, abnd 2750 ft.

Kansas

Lindsborg Production Again Extended North

Another extension for Lindsborg; new field in Simpson for Pratt County.

McPherson County: Lindsborg pool is again extended a 40-acre location north at Pay Petroleum Co.'s Johnson 1, SE NW NE 7-17-3w, which started filling with oil after plugs were drilled from Viola lime topped at 3351 ft. Another offset location has been staked.

Pratt County: A new Simpson sand pool has been opened one mile east of Iuka pool at Hannum Drilling Co.'s Beck 1, SWc 6-27-12w, northeast of Pratt. On state test the well produced 684 bbls, 24 hrs.

Rooks County: W. Hartman's Anderson 1, CSL SW SW 28-9-16w, is a wildcat location east of Westhusin pool near an old well completed as dry after passing up good shows found in Lansing lime.

Sherman County: Sinclair Prairie Oil Co.'s Mercer 1, NE NW 28-10-40w, is a rank wildcat drilling at 500 ft, far from established producing trends of the state.

KANSAS FIELD COMPLETIONS

Barber County: Sun City—Great Lakes Carbon's Schutes 1, nw nw ne 35-30s-15w, Lansing 3840 ft, pay 4287-89 ft, 1000 gals acid, flow 3000 bbls, 4297 ft.
Barton County: Trapp — Transwestern's Michaelis 1, se nw nw 4-16s-13w, Arb 3364-72 ft, 2560 bbls, 3372 ft.
Barton County: Kraft-Prusa—Gulf's Peterman 2, ne nw se 15-17s-11w, Arb 3275 ft, 2000 gals acid, 1147 bbls, 3306 ft.
Shell's Soeken A2, ne se sw 15-17s-11w, Arb 3287 ft, 3000 gals acid, 3000 bbls, 3301 ft.
Vickers' Soeken A1, ne ne se 21-17s-11w, Arb 3273 ft, 3000 gals acid, 4000 gals acid, 639 bbls, 3294 ft.
Barton County: West Ainsworth—Simpson et al's Wondra 1, nw se ne 5-17s-13w, Arb 3363 ft, abnd 3376 ft.
Barton County: West Silica—C. E. Ash's Schartz B4, ce½ ne sw 7-20s-11w, Arb 3313 ft, 3000 bbls, 3321 ft.
Butler County: Eldorado—Cities Service's Wilson 217, cs½ nw nw 8-25s-5e, Kansas City 1890 ft, 2000 gals acid, 45 bbls, 85 water, 2050 ft.
Butler County: South Hanna—C. E. Roth's South Hanna 8, sw sw se 33-29s-8e, Arb 3087 ft, abnd 3140 ft.
Cowley County: Weathered—Bess et al's Vollweider 1, nw ne sw 4-32s-3e, Arb 3287 ft, 2000 gals acid, pump 745 bbls oil, 150 water, 3297 ft.
Cowley County: East Frog Hollow—B. B. Blair's Miller A3, ne ne nw 14-32s-5e, Bartl 3019 ft, base broken Bartl sand 3053 ft, pb 3060 ft, abnd 3075 ft.
Ellis County: Sugar Loaf—Darby's Younger 2, se se nw 20-13s-17w, Arb 3606 ft, abnd 3618 ft.
Ellsworth County: Edwards—Continental et al's Kunkle B1, se se sw 28-17s-8w, Arb 3229 ft, 500 gals acid, 1843 bbls, 3239 ft.
Jefferson County: McLouth—Frank Whitton's Courtney 1, c sw ne 15-9s-20e, sand 1348-75 ft, abnd 1392 ft.
Hatcher & Fisk's Edmonds 2, csw nw 21-9s-20e, sand 1434½ ft, pb 1439 ft, 2.0 MFG, 1451 ft.
Phillips County: Dayton — Schermerhorn's Grote 1, cne nw 1-3s-19w, Topeka 3090 ft, abnd 3475 ft.
Phillips County: Ray—Cities Service's Vehige 3, sw nw sw 28-5s-20w, Reagan 3602 ft, perf, 1819 bbls, 3664 ft.
Cities Service's Reese D1, sw sw ne 29-5s-20w, Reagan 3646 ft, granite 3718 ft, pb 3662 ft, perf, 113 bbls, 3723 ft.
Cities Service's Hensen B4, sw se nw 33-5s-20w, Reagan 3557 ft, 1000 gals acid, 436 bbls, 3566 ft.
Pratt County: Cunningham—Gulf's Bucklin 1, c n½ se ne 11-28s-11w, Viola 4257 ft, 4000 gals acid, 1609 bbls, 4277½ ft.
Reno County: Buhler—Westgate-Greenland's Johns C1, 140 ft w of se nw sw 25-22s-5w, Simpson 3912 ft, abnd 3931 ft.
Reno County: Schweizer—Mid-Continent's Smisor 1, sw se sw 30-22s-9w, Viola 3676 ft, 2000 gals acid, 3000 bbls, 3706 ft.
Reno County: Hendrickson—Tide Water's Withroder 1, sw sw nw 1-23s-10w, Viola 3694 ft, 3000 bbls, 3708 ft.
Reno County: Peace Creek—Leader Oil's

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UTAH
Salt Lake City

WYOMING
Casper
Glenrock
Greybull
Lovell
Lusk
Medicine Bow
Rawlins
Thermopolis
Worland

McMurry 2, sw sw se 10-23s-10w, Viola 3781 ft, 500 gals acid, 3000 bbls, 3785 ft.

Reno County: SW Peace Creek—Simpson Oil et al's Souder B2, sw se ne, 32-23s-10w, Viola 3811 ft, abnd 3826 ft.

Rice County: Chase—Holl & Branine's Christopher 1, 100 ft w of sw ne nw 6-20s-9w, Arb 3303 ft, abnd 3306½ ft.

Russell County: Hall-Gurney—Gulf's Heard 1, nw sw sw 30-14s-12w, Arb 3137 ft, 1123 bbls, 3141 ft.

Russell County: Driscoll—Branine & Goering's Driscoll 1, ne ne ne 31-15s-11w, Arb 3320 ft, abnd 3335 ft.

Stevens County: Hugoton—Huber Carbon Co.'s Hoffman-Dunne 1, c se 5-34s-37w, Herrington 2616 ft, pay 2820-30 ft, 7.2 MFG, 2875 ft.

KANSAS OLD WELL DEEPENED

Barton County: Lanterman—Lario's Rehme 3, cw½ se sw 15-19s-11w, otd 3348 ft, Arb 3330½ ft, 1000 gals acid, 2190 bbls, 3357 ft.

KANSAS WILDCAT COMPLETIONS

Cowley County: Failure—Earl Wakefield et al's Waite 1, ne nw nw 36-31s-3e, Kansas City 2478 ft, Miss 3046 ft, Arb 3385-91 ft, abnd 3391 ft.

Ellis County: Failure—Cromwell & Lewis' McCouley 1, ne ne ne 4-11s-9w, Anhy 1448 ft, Lansing 3315 ft, Congl 3579 ft, Simpson 3597 ft, Arb 3655-60 ft, Cem 3660 ft, abnd 3662 ft.

Marion County: Failure—Cities Service's Goertzen 1, sw sw ne 27-21s-2e, Herington 225 ft, Winfield 290 ft, Ft. Riley 410 ft, Florence 475 ft, Wreford 565 ft, Neva 775 ft, Howard 1440 ft, Topeka 1510 ft, Oread 1805 ft, Stalnaker sand 1892 ft, Lansing 2105 ft, Congl 2708 ft, Weathered chat 2770 ft, chat 2808 ft, Misener 3061 ft, Hunton 3064 ft, Viola 3134 ft, Second Simpson sand 3229 ft, abnd 3240 ft.

Pawnee County: Failure — Stanolind's Gilkinson 1B, csw se 4-23s-16w, Lansing 3649 ft, Congl 4005 ft, Arb 4165 ft, abnd 4230 ft.

Rice County: Failure—Cities Service's Ellis 1, cw½ ne 11-19s-8w, Lansing 2835 ft, Arb 3294 ft, abnd 3324 ft.

KANSAS WILDCAT STARTS

Barber County—N. M. Williams et al's Clay 1, cse se 29-30s-13w, mim.

Barton County—Continental's Miller 1, ne ne ne 21-16s-14w, dr 1970 ft.

Ellsworth County—Harwood Oil Co.'s Proffitt 1, ne ne nw 25-19s-10w, lcn.

Greenwood County—Dunne's Crawford 1-A, se nw se 8-28s-12e, lcn.

Harvey County—Simpson Oil Co.'s Speaker 1, ne se ne 10-24s-10w, rig.

Jefferson County—McLaughlin's Bodde 1, nw nw sw 28-8s-20e, mchy.

Magnolia's Burns 1, se ne nw 33-11s-20e, mim.

Leavenworth County—E. C. Ellis' Stolzer 1, c sw nw 23-8s-20e, dr 17 ft.

Reno County—N. Appleman et al's Halton 1, ne ne se 6-22s-9w, lcn.

Rooks County—Broadview Oil's Byrnes 1, cs½ ne sw 26-8s-16w, rig.

W. L. Hartman's Anderson 1, cs½ sw sw 28-9s-16w, cellar.

Russell County—Black-Marshall Oil Co.'s Fairchild 1A, ne ne nw 36-12s-13w, mim.

Phil-Han et al's Lipprand 1, c nw ne 11-15s-13w, lcn.

Stafford County—Helmerich & Payne et al's O'Brien 1, sw sw sw 27-25s-11w, mim.

NEW MEXICO FIELD COMPLETIONS

Eddy County—Dixon & Yates' Saunders 6-A, ne se nw 12-18s-29e, flow 320 bbls 2-in, shot 150 qts 2665-89 ft.

Sanders Bros. et al's Leonard 7, c ne nw 34-16s-30e, flow 100 bbls 2-in, shot 225 qts 2880-2950 ft, td 2970 ft.

Lea County: East Lusk — Culbertson & Irwin - Southern Cal. Pet. Corp.'s Lynch - Texaco 2, c nw sw 21-19s-32e, pump 36 bbls oil and 18 bbls water, shot 20 qts 2620-43 ft, td 2820 ft, pb to 2643 ft.

NEW MEXICO OLD WELL DEEPENED

Lea County: Maljamar—Kewanee Oil Co.'s (was B. Cockburn) Baish 6-B, c se nw 27-17s-32e, otd 3905 ft, flow 403 bbls 2-in, shot 380 qts 3905-4100 ft.

NEW MEXICO WILDCAT COMPLETIONS

Eddy County: Failure—Culberson & Irwin, Inc.-Universal Consolidated Oil Co.'s Hale 1, c sw se 11-19s-30e, elev 3345 ft, base salt 1691 ft, brown lime 1820 ft, abnd sul water 2270 ft.

Eddy County: Discovery—P. B. English et al's Turner 1, c sw se 25-17s-30e, elev 3579 ft, salt 575-1335 ft, pump 45 bbls oil, plus 5 bbls water, shot 120 qts 3334-96 ft, td 3545 ft, pb to 3450 ft.

NEW MEXICO WILDCAT STARTS

Grant County—Winninger Bros. & R. D. Berry's State 1, 850 ft from e and 1600 ft from s lines 16-27s-16w, fsh 1430 ft.

Lea County—Olen F. Featherstone et al's Watkins 1, 660 ft from s and 980 ft from e lines 31-18s-32e, lcn.

Geo. P. Livermore's State-Maxwell 1, c ne ne 26-15s-34e, lcn.

R. Olsen Oil Co.-Atlantic's Langlie 1, c se se 11-25s-37e, sp on Ordovician test.

West Texas

Big Well Widens Sand Hills Production

Two tests near prolific Ellenburger producer on Embar prospect, Andrews County, failed to indicate production in 6300-foot Clear Fork zone. Ordovician is next objective of two isolated wildcats in Andrews County. South portion Sand Hills field enlarged by big well. Delaware wildcat in Ward County finaled.

Andrews County: Phillips Petroleum Company's University-Andrews 3 and 4, nearest operations to its 7800-ft Ellenburger producer in the Embar pool, drilling at 6840 ft and 6750 ft, respectively, having failed to register prospective production in the 6215-6450-ft Clear Fork, which showed for big flow gas with oil spray in the discovery. Numerous tests being drilled on short-term University leases in Blocks 10 and 11 between the Embar and West Andrews pools and on a strike between the West Fuhram and Emma pools are temporarily completing as small producers in the regular 4400-ft Permian with the two deeper zones as the ultimate objectives.

Atlantic et al's University-Texu 1-A southwestern Andrews County deep project, drilling dry lime 7530 ft, having yielded 30 ft gas-cut mud with trace oil on drill-stem test in Clear Fork at 7066-7150 ft. Humble's Sims 1, northwest corner of the county is credited with logging base of the Permian at 8150 ft, and is fishing for stuck drill pipe at 8885 ft in lime.

Ward County: J. E. Fitzpatrick and Fred Hyer's Pruitt 1, four miles northeast of Monroe pool, flowed 15 bbls oil, plus 25 percent water, after nitro shot in Delaware sand at 4825-69 ft, opening a new pool. Shell's Sealy-Smith 1, recent Ellenburger discovery for the county, has not been given final potential gauge from prolific Ellenburger section at 10,082-10,338 ft, although it is known to be capable of a large output. This discovery has greatly stimulated interest in Ordovician possibilities on a trend to the north of the Embar strike. Three such tests are in store for Winkler County, including the deepening of Magnolia's State-Walton 20 from 8445 ft, provided casing can be secured.

Crane County: Gulf's Waddell et al 41, east extension for the south portion of Sand-Hills field, flowed natural at the rate of 3080 bbls oil and 6,216,000 ft gas daily from Ellenburger at 5645-55 ft, and will acidize.

WEST TEXAS COMPLETIONS

Andrews County: West Andrews—Phillips' University-Andrews 6, c se nw sec 25, blk 11, elev 3275 ft, pump 38 bbls 36-gr oil, shot 480 qts 4240-4362 ft, td 4377 ft.

Stanolind's University 1-V, c sw ne sec 2, blk 11, elev 3311 ft, pump 35 bbls oil, 14 water, shot 550 qts 4323-4425 ft, td 4437 ft.

Crane County: Sand Hills—Gulf's Waddell et al 38, 440 ft out swc PSK 29, blk B-26, flow 282 bbls 2-in, gas/oil ratio 24,666/1, shot 420 qts 4370-4585 ft, td 4652 ft.

Hockley County: Slaughter—DeKalb Agricultural Assn.'s Alexander 1, 554 ft out nec s-372-ac PSL 7, blk X, flow 1653 bbls cas, acid 10,000 gals 5001-43 ft.

Honolulu's Slaughter 35-B, nec lab 50, leag 37, Zavalla CSL sur, flow 1213 bbls 2½-in, acid 10,000 gals 4900-75 ft.

Mitchell County: Northwest—F. W. Merrick's Strain 4-B, 330 ft from w and 2591 ft from n G. Y. McWilliams sur, pump 88 bbls, shot 720 qts 1550-1716 ft, td 1722 ft.

Pecos County: Abell—Stanolind & Anderson-Prichard's Stine 2-A, c lot 4, H&GN 24, blk 9, flow 569 bbls ⅝-in, acid McKee perforations 5290-93 ft, td 5330 ft.

Pecos County: Walker—Wm. Wolf et al's University 1-A, ne se se sec 26, blk 16, pump 127 bbls, shot 60 qts 1773-90 ft, td 1803 ft.

Wm. Wolf et al's University-Lancaster 4-A, ne ne ne sec 26, blk 16, pump 10 bbls oil plus 12 bbls water, shot 50 qts 1764-77 ft, td 1785 ft.

Winkler County: Emperor—Skelly's Halley 49, ne sw sw PSL 15, blk B-11, flow 1273 bbls ¾-in, shot 275 qts 2753-2893 ft.

Winkler County: Hendrick—Stanolind-Westbrook-Thompson Oil Corp.'s Hendrick 1-T-88-H-X-2, near c sw ne PSL 28, blk B-5, flow 206 bbls ½-in, shot 210 qts 2905-90 ft.

Winkler County: Keystone—Texas Co.'s Campbell 11, 555 ft from nec nw¼ PSL 22, blk B-5, flow 105 bbls, shot 150 qts 3286-3360 ft.

Yoakum County: Waples-Platter—Drilling & Exploration Co.'s Waples-Platter (Shell) 1-A, c ne nw sec 616, flow 150 bbls ⅞-in, acid 3000 gals 5215-95 ft.

Yoakum County: Wasson—Westex Oil Co.'s Corder-Shell 3, 440 ft from n and 1824 ft from w lines PSL 36, blk AX, flow 219 bbls ⅜-in, acid 10,000 gals 4920-5025 ft.

WEST TEXAS WILDCAT COMPLETIONS

Cochran County: Failure—John Redfern Jr. et al's Wright 1, 660 ft out nwc lab 2, leag 95, Mills CSL, elev 3733 ft, anhydrite 2210 ft, brown lime 3690 ft, San Andres 4020 ft, abnd sul w 4840-5004 ft.

Pecos County: Failure—Grapeland Oil Co.'s McKay 1, 330 ft from n and 4950 ft from e lines I&GN 33, blk 1, abnd 1469 ft.

Reagan County: Failure—Rowan Drl. Co.'s Hughes-Shell 1, c se ne L&SV 7, blk F, elev 2674 ft, anhydrite 1060 ft, salt 1121 ft, Yates sand 1760 ft, frosted grains 1790 ft, lime 2851 ft, abnd sul water 3122-28 ft.

Sutton County: Failure—S. B. Roberts-M. C. Moore's Allison 1, c nw ne GH&SA 44, blk K, elev 2364 ft, Palo Pinto 3725 ft, Strawn 4663 ft, detrital 5140 ft, Ellenburger 5167 ft, abnd 5416 ft.

WEST TEXAS WILDCAT STARTS

Crane County—Skelly's Richardson 1, 7190 ft from ne and 660 ft from se lines H&TC 5, blk 31, lcn Ordovician test.

Martin County—Lem Peters et al's Ida Walcott 1, c n½ leag 254, Ward CSL sur, lcn 5300-ft test.

Reeves County—Chris Antone et al's T. P. Land Trust 1, c ne ne T&P 47, blk 58, Tsp. 2, lcn 3000-ft test.

North Texas

Hoefle Production Extended Mile Southeast

Hoefle pool extended more than mile southeast. Prolific producer from Mississippian in Scotland pool. Baylor County wildcat showing for small pumper. Montague County pool assured of second producer.

Jack County: Hanlon - Buchanan's Griffin 1, 1⅔ miles southeast of Hoefle pool, flowed 51½ bbls of oil in 3 hrs, 29/64-in choke, acidized Bend saturation 4851-86 ft, making seventh producer for area. Taubert - McKee and Sinclair Prairie's Boyd 1, reworked discovery on the Post Oak prospect, making potential test after flowing 147 bbls fluid, 50 percent oil, on 8-hr test, acidized Ellenburger perforations 6408-18 ft.

Archer County: Shell's Coleman 3-G-C, SW NE ATNCL 74, northeast portion Scotland pool, responded to treatment with 1000 gals acid in Mississippian saturation 5284-5364 ft, flowing 649 bbls oil in 1¼ hrs, gas volume rated 4,000,000 daily. Geo. Cooper et al's Knight 1, wildcat between K-M-A and Hull-Silk fields that passed up small production in Strawn, drilling lime 4770 ft to explore Ellenburger before plugging back for completion.

Baylor County: Jordan Petroleum Co.'s Fayette 1, 1½ miles northeast of Rendham pool, installing pump after swabbing small volume fluid, 30 percent oil, following 1000-gallon acid treatment of Palo Pinto at 3017-25 ft.

Montague County: Sinclair - Prairie's Hill 1, west offset its Sanders pool discovery, assured production in yielding 1000 ft of oil on drill-stem test in Bend

conglomerate at 5957-71 ft, 30 ft low, and to explore section before running pipe for completion. Benson Bros. et al's Staley 1, north outpost Ringgold pool, drilling broken conglomerate at 5860 ft, having tested 300 ft salt water through drill pipe at 5722-41 ft in Bend, topped 5692 ft, 90 ft low to nearest well. Continental's Hildreth 1, 1¾ miles northeast of Gant-Turner 1-well pool, drilling 6150 ft, having yielded 60 ft oil and 80 ft oil-cut mud, 2560 lbs bottom-hole pressure, on drill stem test in Bend at 5994-6005 ft, and Penn 1, east offset to discovery, abandoned in Simpson water at 7561 ft. Jerry Hawkins et al's Lowrie 1, 2¼ miles east by north Owens - Hults pool, attempting drill-stem test in broken conglomerate at 6241-67 ft in Bend, topped 6185 ft.

NORTH TEXAS FIELD COMPLETIONS

Clay County: Ross—Continental et al's Avis 4, 2748 ft from s and 660 ft from e Rains CSL 17, flow 276 bbls ½-in. acid 8000 gals Bend perf 5354-94 ft and 5470-80 ft, td 5500 feet.

Clay County—Geo. Golden et al's Enyart 8, blk 7, Thornberry subdiv of F. Longario sur, abnd 1172 ft.

Young County—Ben Rankin & Elliott Prod. Co.'s Sanders 1, 660 ft out SWC TE&L 1963, flow 76 bbls oil, 225 bbls water, acid 2000 gals Bend perf 4074-79 ft, td 4083 ft.

NORTH TEXAS OLD WELL DEEPENED

Young County—Scott & Graham's Williamson 3-A, NEc TE&L sec 458, otd 3954 ft, top Mississippi 4790 ft, Ellenburger 4915 ft, pump 10 bbls, pb to original depth 3948 ft, td 4929 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Clay County: Failure—E. C. Harlin Jr. et al's Bentley 1, blk 54, Specht-McCutchen sur, abnd 1200 ft.

Cooke County: Failure—Seitz-Comegys & Seitz, Inc.'s O'Neal 1, 330 ft from n and 520 ft from w A. Pope sur A-818, abnd in Ellenburger 2660 ft.

Throckmorton County: Failure—Amerada's Williams 1, 660 ft from n and 1212 ft from e lines Wm. Cassell sur A-184, Cisco 580 ft, Canyon 1470 ft, Bend 4550 ft, Mississippi 4925 ft, Ellenburger 5135 ft, abnd 5478 ft.

Young County: Failure—J. G. Darden et al's Stowe 1, 330 ft out NWc TE&L 228, abnd 1098 ft.

NORTH TEXAS WILDCAT STARTS

Archer County—White & Duncan's J. T. Richardson 1, 330 ft out NWc n½ of s-80 ac W. C. McCune sur A-943, lcn.

Perry Browning et al's Fee 1, 467 ft out SWc blk 87, German Emigration Co. sur, lcn 6000-ft test.

Cooke County—W. T. Lucas et al's H. E. King 1, 330 ft out SWc n½ of w-80 of 225-ac tr, Melville Langham sur, 3 mi s Myra, lcn.

Jack County—Joe A. Worsham et al's L. A. Meador 1, c of n½ Henderson CSL 22, blk 1, 1 mi nw Gibtown, lcn 5000-ft test.

Montague County—S. H. Fagadau et al's Johnson-Texaco 1, 467 ft out SWc 200-ac tr, John Short sur A-664, lcn 4200-ft test.

Seitz-Comegys & Seitz, Inc.'s E. B. King 1-B, 1551 ft from n and 330 ft from e lines se¼ blk 8, E. B. Wooten sur A-840, lcn 2500-ft test.

West Central Texas

Coleman County Well Plugging Back for Gas

Coleman County prospect plugging back for completion in prolific gas sand. Coker pool records largest producer. Jones County wildcats pass up oil shows.

Coleman County: Woodley Petroleum Co.'s Thompson 1, 4 miles southeast of Silver Valley pool, nearest production, rated 10,000,000 gas daily, 1100 pounds pressure, on drill-stem test at 2810-39 ft in Morris sand, topped 2807 ft, elevation 1923 ft. Failed to encounter additional pay in lower Strawn in drilling to 3492 ft, and plugged back to 2875 ft to make gasser. H. T. Owen and H. H. Adams' Coker 2, ¼-mile south of their Coker pool discovery, flowed 201 bbls oil natural in 11 hrs Morris sand from 3011-30 ft, elevation 1928 ft.

Jones County: Thos. D. Humphrey's Fee 1 passed up show of oil in lime at 1933-35 ft, and was drilling at 2235 ft. Merry Bros. & Perini's Dodge 1, also wildcat in south part county, logged show of oil at 2210-18 ft, drilling lime 2410 ft.

WEST CENTRAL TEXAS FIELD COMPLETION

Jones County: Ungren — Frazier et al's Swenson 1, c se nw BBB&C 192, elev 1518 ft, abnd 3295 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Callahan County: Failures—Wm. D. Austin et al's Williams 1, 150 ft out SEc S.P. Ry. sec 301, abnd 947 ft.

C. D. Haggerty et al's Williams 1-65, 870 ft from n and 450 ft from w sec 65, Bayland Orphan Lands, abnd 736 ft.

A. L. Wasson et al's White 1, NEc sec 26, Victoria CSL leag 337, abnd 806 ft.

Jones County: Failures—Butler-Horne Drl. Co.'s Minter 1, SP 39, blk 2, abnd 3496 ft.

W. R. Seed-F. B. Evans' Walker 1, 330 ft from n and 3445 ft from e of 419-ac tr, G. Martinez sur A-254, abnd 2212 ft.

Shackelford County: Discovery — R. H. Roark et al's Nail 1, c sw se ET Ry sec 135, elev 1710 ft, pump 60 bbls, sand 1508-14½ ft, sandy-lime 1514½-21 ft, td 1522 ft.

WEST CENTRAL TEXAS WILDCAT STARTS

Brown County—Hightower O&R Co.'s C. H. Wilson 1, 210 ft from se and 1066 ft from ne lines 100-ac tr, Sam Durr sur, lcn.

Jones County—Merry Bros. & Perini's Winters 1, 330 ft out SEc Lot 1, John Winters sur, leag 138, lcn.

Taylor County—Fain-McGaha Oil Corp.'s Smith 1, 1823 ft from n and 1497 ft from e lines Jose Gabo sur 128, lcn.

TEXAS PANHANDLE COMPLETIONS

Carson County—Skelly's Schafer 147, I&GN 190, blk 3, pump 350 bbls, shot 367 qts 3200-72 ft.

Gray County—Magnolia's Fee (Td 227) 52, I&GN 15, blk 3, pump 123 bbls, shot 300 qts 2905-98 ft.

Phillips' McKinney 7, I&GN 137, blk 3, pump 225 bbls, shot 440 qts 3194-3299 ft.

Hutchinson County—J. M. Huber Corp.'s Burch-Weatherly 3, A&B 24, blk Y, pump 229 bbls, acid 1200 gals 3015-37 ft, td 3099 ft.

J. M. Huber Corp.'s Weatherly 19, A&B 26, blk Y, pump 221 bbls, lime 2966-78 ft, td 2988 ft.

Moore County—Shamrock O&G Co.'s McDowell 2, sec 12, blk 1, P.D. sur, 170,000,000 gas, 332 lbs rock pressure, acid 7000 gals 3100-3208 ft td 3250 ft.

Wheeler County—Pendleton & Vaughan's McDowell 1, c ne H&GN 55, blk 23, elev 2552 ft, 14,200,000 gas, td 1698 ft.

East Texas

Club Lake Has Second Well and First Failure

Club Lake pool lists second producer and also a failure. Cherokee County wildcat shows promise of distillate production at record producing depth for district. Thick section of Paluxy oil saturation logged by second well in Black Oak pool, Wood County.

Hunt County: Hollandsworth Drilling Co. et al's Baker 2, 990 ft north of its Club Lake pool discovery, was flowing into pits to clean itself with production rated equal to Baker 1, from sand perforations at 2949-66 in Woodbine, topped at 2749 ft, elevation 494 ft, 4 ft high. Cut fault at 2390 ft, and reached water at 2936-70 ft, 5½-in 2962 ft. L. A. Grelling and Don F. Hugus' Graham 1, 990 ft west of the discovery, proved to be on the downthrow side of fault and abandoned in Woodbine water sand 2905-3104 ft, elevation 512 ft. Great State Oil Corp.-C. Andrade, III's Schenck-Floyd 1, Mary Latham Survey, 2 miles southwest of Club Lake pool, apparently on downthrow side of fault, and abandoned 3022 ft, elevation 497 ft. Fred Prince and Gene Germany's Miller 1, C.C.I. Co. Survey, 2 miles northeast of Club Lake pool, appeared failure at 2795 ft, elevation 492 ft, where operations were halted to run electric log.

Cherokee County: Humble's Curtis 1, John Vaughn Survey 53, first deep test on the Larissa prospect, yielded small amount 45-gr distillate with gas show when tester used at 9880-93 ft in Lower Glen Rose (Rodessa). Test was made in rat hole, and reaming was in progress late last week to make second drill-stem test. Massive anhydrite logged 9510-9604 ft, elevation 490 ft.

Wood County: Amerada's Faulk 1, ¼-mile east of its prolific oil discovery for the Black Oak prospect, entered Paluxy oil sand 6230 ft, elevation 498 ft, 22 ft high, and logged section of oil sand comparable to the initial producer in drilling to water table at 6380 ft. Casing has been landed on bottom to complete through perforations. Faulk 1 topped Georgetown 5090 ft. Amerada's Kennemer 2, south offset its discovery, entered Georgetown at 5130 ft, elevation 512 ft, 26 ft low, and drilling 5830 ft. General American Oil Co.'s Rodney 1, ¾-mile west by north of discovery, drilling 5930 ft in Georgetown, topped 5165 ft, elevation 529 ft, 44 ft low. Jerry Hawkins et al's Clark 1, ½ mile northeast outpost, fishing 5118 ft in Georgetown, topped between 5110-20 ft, 29 to 39 ft high. The Black Oak pool discovery has base allowable of 140 bbls daily, but is shut in pending a price schedule. Elevation has been corrected to 508 ft.

Wildcats: Falcon Co.'s Kiett 1, S. Benton Survey, projected Smackover-lime test for Navarro County, drilling 1900 ft, Austin chalk 1340-1730 ft. John Hoosier et al's Black 1, Bazette area, squeezed Woodbine perforations 3272-79 ft that recently showed for small oil and gas flow, and will reperforate. In Trinity County, Magnolia's Cameron 1, 3 miles southeast Glendale, tested water through perforations 5740-45 and 5716-23 ft, and will retest Wilcox 5640-45 ft, 5½-in 5835 ft, total depth 7310 ft. In Morris County, M. H. Marr and Bert Fields' Sheppard 1, Naple area, drilling 4150 ft in Georgetown, topped 3815 ft.

Houston County: M.G.M. Oil Co.'s Hartt 1, near Lovelady pool discovery, awaiting orders 3309 ft in Carrizo, topped 2103 ft.

EAST TEXAS FIELD COMPLETIONS

Anderson County: Concord—Magnolia's Fitzgerald 1, 660 ft out nec 180½-ac lse, J. N. Fitzgerald sur, elev 704 ft, Austin chalk 4360-4753 ft, Woodbine 4943 ft, Georgetown 5192 ft, abnd 5215 ft.

Wood County: Hawkins—B. F. Phillips et al's Snyder 1, 330 ft out nwc 40-ac lse, S. Castleberry sur, elev 318 ft, Austin 4494-4572 ft, Woodbine 4742 ft, abnd 5000 ft.

EAST TEXAS WILDCAT COMPLETIONS

Limestone County: Failure—Mudge Oil Co.'s New 1, 330 ft from nw and 1791 ft from sw lines 106.7-ac tr, Andres Varela sur, abnd Woodbine 3506-3627 ft.

McLennan County: Failure—Texas Water Co.'s City of Waco 1, 2700 ft e and 200 ft s of nec J. M. Sampler sur, but in J. M. Stephens sur, top Travis Peak 1865 ft, abnd 2150 ft.

Van Zandt County: Failure—Chas. H. Alexander Jr. et al's Sides 1, 660 ft out e cor 310-ac tr, Q. C. Nugent sur, elev 529 ft, Pecan 2565-2645 ft, top Austin 2710 ft, abnd 3200 ft.

EAST TEXAS WILDCAT STARTS

Hunt County — Great State Oil Corp.-C. Andrade's Schenck-Floyd 1, c blk 2, of (west) Mary Latham sur A-597, 500-ac lse, Austin 2200 ft, sd 3022 ft.

F. D. Prince and E. B. Germany's Miller 1, swc n½ 320-ac lse, C. C. I. Co. sur A-1203, dr 2500 ft.

Robertson County—Fitzwater & Co.'s Stegall 1, 3150 ft from ne and 660 ft from s lines E. McMillan sur, 2½ mi w Franklin, rig.

Smith County—Sinclair Prairie's W. F. Swinney 1, 489 ft from n&s and 891 ft from e&w lines 48.16-ac tr, Wm. Lockhart sur A-563, 2 mi s Chapel Hill field, cem cas 1377 ft.

Trinity County—Stanolind's Texas Long Leaf 1, 766 ft from s and 6254 ft from w lines 1000-ac lse, F. Martinez sur, dr 550 ft.

Southwest Texas

New and Scattered Drilling Puts Wildcats at High Level

Southwest Texas wildcatting play centers more closely around the Wilcox trend as several more strikes are evidenced. New operations are being started or projected throughout the region to bring this type of exploration to the highest level since the beginning of the Carrizo-Wilcox search.

Bee County: Luling Oil & Gas Co.'s Slick 2 w-B, northeast outpost to South Caesar, cored oil sand in Queen City at 5571-74 ft, now drilling 6100 ft to go to 6600-ft pay.

Dewitt County: Tidewater's Gips 1, third Wilcox discovery for county, continuing tests, flowed 100 bbls colored dist through ¼-in choke, 1200 lbs tp, 1300 lbs cp, from perforations at 8336-44 ft.

Hidalgo County: Seaboard's Boston-Texas 1, Los Guages grant, 6 miles west of McCook, recovered gas on drill-stem test at 6214-25 ft, now drilling below 6650 ft.

Jackson County: Magnolia's Moody 1, 3700 ft northwest of North LaWard field, perforated at 6482-87 ft and testing.

Jim Wells County: Coastal Refineries' Wright 1, Koopman field, flowed gas with 1½ bbls of 48-gr oil from perforations at 4690-92 ft, opening a new sand.

LaSalle County: Quintana's South Texas 13, 1 mi northwest of Washburn field and on another trend faulting, recovered 3200 ft of oil with a little salt water, 45 lbs pressure, on 30-minute drill-stem test at 5098-5115 ft.

SOUTHWEST TEXAS FIELD COMPLETIONS

Duval County: Driscoll—Continental's Driscoll 80-A, sec 52, n outpost, 44,000,000 gas, 2-in, 1050 lbs tp, 1200 lbs cp, perf 3327-47 ft, td 3701 ft.

Continental's Driscoll 81-A, sec 23, 123 bbls 31.5-gr, ¼-in, 600 lbs tp, 1000 lbs cp, gas/oil ratio 2780/1, perf 3320-28 ft, td 3342 ft.

Duval County: Kreis — Bridwell Oil Co.'s Escapule 7, sec 75, abnd 3284 ft.

W. W. Hawkins' Kreis 1, sec 516, abnd 3333 ft.

Starr County: N. Sun—Sun's Garza 5, Sh 11, outpost, abnd 4674 ft.

SOUTHWEST TEXAS WILDCAT COMPLETION

Webb County: Failure—Union's Volpe 2-A, sec 2010, abnd 6691 ft.

SOUTHWEST TEXAS WILDCAT STARTS

Duval County—Dan Auld's Dunn 1, 660 ft s and e lines 1000-ac lse, Diego Hinojosa gr, 5 mi sw Realitos, 5000-ft test.

Jim Hogg County—Sun's East 1-D, 3300 ft w'ly w line, 3300 ft s'ly s line 4503-ac lse, Arriba gr, 26 mi sw Hebbronville, 6000-ft test.

Webb County—Mills Bennett's R. Benavides 4, 660 ft n, 1980 ft w lines sec 702, 5 mi nw Bruni, 4000 ft test.

LOWER GULF COAST FIELD COMPLETIONS

Bee County: S. Caesar—Southwood Oil Co.'s Grissom 1, McEarlen sur, outpost, abnd 6615 ft.

Jackson County: Harmon—Gulfboard's McCrory 1, York sur, 112.25 bbls 27.5-gr, ⅛-in, 590 lbs tp, cas sealed, gas/oil ratio 262/1, perf 5384-94 ft, td 5399 ft.

Jackson County: Maurbro—Humble's Mauritz 9-B, B. J. White Lge, 159.5 bbls 25.2-gr, ¼-in, 60 lbs tp, 660 lbs cp, sand 5222 ft, 5½-in 5213 ft, td 5235 ft.

Jim Wells County: Orange Grove — Cities Service's Schunneman 6, tr 9, 79 bbls 34-gr, 9/64-in, 800 lbs tp, 1200 lbs cp, gas/oil ratio 2696/1, perf 5083-86 ft, td 5091 ft.

Jim Wells County: Seeligson — Sun's P. Canales 11, Stevens sur, 115 bbls 40.8-gr, 7/64-in, 740 lbs tp, 800 lbs cp, perf 5243-48 ft, td 6040 ft.

Kleberg County: Seeligson—Humble's King-Cabeza 1, King sur No. 50, ne outpost, 148 bbls 41-gr, ⅛-in, 1200 lbs tp, cas sealed, gas/oil ratio 771/1, perf 5983-6001 ft, td 6020 ft.

Nueces County: Agua Dulce—Pan American's Aetna 4, sec 306, abnd 6485 ft.

Refugio County: Fagan—P. R. Rutherford's Fagan 1-D, N. Fagan sur, sw outpost, abnd 6514 ft.

San Patricio County: Odem — Seaboard's Ellis 1, sec 7, 100 bbls 31.5-gr, ⅛-in, 500 lbs tp, 525 lbs cp, gas/oil ratio 410/1, perf 5329-31 ft, td 5542 ft.

LOWER GULF COAST WILDCAT COMPLETION

Jim Wells County: Failure—Hickok & Reynold's Reynolds & Richardson 1, Sur 210, 7 mi se Alice, abnd 6206 ft.

LOWER GULF COAST WILDCAT LOCATIONS

Bee County—Stanolind's Gould 1, 660 ft ne and nw lines W. C. Gill sur, 8 mi sw Kenedy, 9500-ft test.

Brooks County—Jay Simmons' J. E. Maupin 1, 660 ft n and w lines e 262-ac sur 311, 22 mi sw Falfurrias, 6500-ft test.

Colorado County—Shell's Schiurring 1, 1200 ft sw, 1490 ft se lines 279-ac tr, sur 6, 4 mi sw Garwood, 7000-ft test.

Goliad County—Dan Auld and W. W. Carter's Wallace 1, 2325 ft nw, 2725 ft ne lines S. Vela sur, nw Goliad, 8500-ft test.

Jackson County—J. B. Coffee's Mauritz 1, 660 ft n and w lines lot 5, Heard sur No. 13, 5 mi s Ganado, 6600-ft test.

Karnes County—Dan Auld's Ingram 1, 660 ft se and sw lines 1000-ac lse, C. Martinez gr, 6 mi se Kenedy, 8500-ft test.

Live Oak County—Humphries & Hotchkin's G. Rowald 1, 330 ft s and e lines 157.27-ac lse, B. Haughey sur, 2 mi ne Three Rivers, 2000-ft test.

Moore Dev. Co.'s O. Doebbler 1, 660 ft s and e lines 200-ac lse, Simmons sur, 5 mi s Simmons City, 3000-ft test.

Nueces County—Richardson Pet. Co.'s Chapman 2, 1980 ft w, 660 ft n lines sec 43, 1 mi se Petronilla extension area, 7000-ft test.

Victoria County—Pool & Johnston's Wilden 1, 660 ft n and e lines 178-ac tr, Victoria Grant, 3 mi sw Victoria, 4600-ft test.

Stewarts' Warden-Lowery 1, 2725 ft sw, 1320 ft se lines 2240-ac lse, E. McDonough sur, 9 mi sw Victoria, 6000-ft test.

SOUTH CENTRAL TEXAS FIELD COMPLETION

Caldwell County: Bee Creek—R. R. Ogden's Talley 16, Swearingen sur, 99 bls 35-gr, cas slotted 2188-2222 ft, Dale lime 2168 ft, td 2280 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETION

McMullen County: Field Discovery—Quintana Pet. Co.'s South Texas 1-C, sec 25, 12 mi s Fowlerton, 6,000,000 gas ¼-in, 1460 lbs tp, cas sealed, sip 2000 lbs perf 5720-26 ft, Wilcox 5719-5780 ft, td 7623 ft.

SOUTH CENTRAL TEXAS WILDCAT STARTS

Gonzales County — Continental's Bruns 1, 330 ft se, 40 ft sw lines 74-ac tr, W. Newman sur, 7 mi s Gonzales, 8000-ft test.

Wilson County—Holland Oil Co.'s McKinney 1, 50 ft se, 660 ft ne lines nw 50.5 ac of 82.5-ac tr, E. Smith sur, 3½ mi sw Nixon.

Texas Gulf Coast

New Fields Opened in Matagorda and Austin

New fields were opened in Matagorda and Austin counties, as other wildcats continued to have trouble in completing.

Matagorda County: The new field indicated for several weeks northwest of Bay City and northeast of North Markham field was assured when Ohio Oil Co.'s McDonald 1, J. Betts Survey, gauged 196 bbls in 24 hours through ⅛-in choke after perforating at 8406-08 ft in Frio sand. Company is debating whether to complete at this level or test other showings while rig is at location. Sun and Ohio will each offset the discovery well.

Austin County: Shell Oil Co. has completed Hintz 1, Geo. T. Allen Survey, wildcat in Sealey area, for 57 bbls daily 54-gravity distillate through ¼-in choke and 183 perforations at 8700-24 ft. This well drilled to 11,501 ft, and showed salt water when tested at several deeper levels.

Harris County: Union Production Co.'s Broh Estate 1, most southerly of North Houston field gas producers, showed gas on drill-stem test 6789-6819 ft, but was drilling ahead to contract depth of 7600 ft.

Trinity County: Magnolia continued unsuccessful in its attempts to complete Cameron Lumber 1, Bond Survey, three miles southeast of Glendale. Last week it was tested through perforations at 5716-23 ft, but again showed salt water. Perforations have been squeezed for another attempt.

Fort Bend County: Magnolia and Placid Oil Co.'s Huntington 2, northwest of Rosenberg, again failed to show properly when perforations at 8860-68 ft were tested, and company will decide to make another completion attempt in this zone or plug back to higher level.

Montgomery County: Superior-Atlantic's McMahan 1, Deering Creek wildcat, perforated at 9725-48 ft but again showed salt water. Tests made at several deeper points have all showed water. Will plug back for another shutoff and test other showings.

Houston County: E. J. McCullough's Hartt 1, John Forbes survey, quarter mile east offset to Ed Gillespie pool opener, failed to find production down to 3228 ft, where Gillespie's well had 14 ft of saturated sand. Test has been abandoned.

TEXAS GULF COAST FIELD COMPLETIONS

Chambers County: Oyster Bayou Extension—Sun's Jackson et al 1, 787.79-ac tr, 1678 ft fr n and 2343 ft fr w l of T&NO 126, ne extension, ts 8300 ft, pb 8363 ft, perf, 398.17 bbls 3/16-in ch, tp 1350 lbs, gor 696-1, td 8373 ft.

Orange County: East Goodrich—Pan American's Texas Long 1, 808.73-ac tr, A. Viesca 7 Lge, Gr A-77, 1500 ft from se and 1867 ft fr n l of lse, abnd 4136 ft.

TEXAS GULF COAST WILDCAT COMPLETION

Harris County: Failure—J. H. Woodward, Jr., Griffith 1, 500-ac tr, A. R. Bodman sur, 3 mi sw Humble, abnd 4288 ft.

TEXAS GULF COAST WILDCAT STARTS

Austin County—Ohio's First Natl Bk of Galveston 1, 9 mi sw Sealy in Orange Hill area, 250-ac tr, Vital Flores Lge, 660 ft fr se and ne l of tr and lge. Contract depth 10,500 ft.

Fort Bend County—H. C. Cockburn's Albright 1, 5 mi w Rosenberg, 110-ac tr, 660 ft fr s and w l 40-ac unit or 660 ft s and 1980 ft fr e l of SA&MG 19. Contract depth 8300 ft.

H. C. Cockburn's Wenzel 1, 8 mi nw Rosenberg, 135.5-ac tr, Lester Cross Sur 24, Turkey Creek Sbdn, 660 ft fr n and w l 40-ac unit in nwc or 660 ft from n and w l of sur. Contract depth 8500 ft.

J. K. Dorrance and Wynne Crosby Drlg Co.'s Blakely & Nelms 1, 5 mi w Clodine, 86.6-ac tr, Thos. Habermacher Sur A-190, 467 ft fr ne and se l of sur. Contract depth 8000 ft.

Harris County — G. W. Strake's Florence and Parker 1, 2 mi ne Aldine, 83.13-ac tr, WCRR Sec 16 Blk 4, 660 ft fr e and w l and 330 ft fr s l of tr. Contract depth 7750 ft.

Glenn H. McCarthy's Bregetta Prox 1, Stowell area, 100-ac tr, B. A. Vacosis Lge A-53, lot 14, Theo. F. Koch sbdn, 330 ft fr n and w l lot 14. Contract depth 9500 ft.

Matagorda County — Continental's Henry Rugely 1, Sheppard Mott area, 1725-ac tr, I&GN 6, Blk 2. Contract depth 6500 ft.

Pure's LeTulle 1, Collegeport area, 64-ac tr, GM&D Sur A-186, 2400 ft from s l Sec 27 and 1650 ft fr e l of sur. Contract depth 5000 ft.

Louisiana Gulf Coast

Jug Lake Produces; Good Sparta Well at Pine Prairie

A new field in Terrebonne Parish and opening of Sparta sand production on southwest flank of Pine Prairie, Evangeline Parish, were the week's developments.

Terrebonne Parish: Superior Oil Co.'s LaTerre Land 1, proved the Jug Lake prospect productive by flowing 162 bbls 34.5-gravity oil daily through 8/64-in choke on top and ⅝-in on bottom at

10,214-19 ft. Tubing pressure was 1800 lbs. Gas production was reported at only 88,000 ft. Total depth of well is 13,417 ft; shutdown awaiting state potential gauge.

Evangeline Parish: The Texas Co. opened Sparta sand production on the southwest flank of Pine Prairie dome with DeLanois Land & Stone B-2. The well flowed 205 bbls 28-gravity oil, no water, in 21 hours through 10/64-in choke against 1200 lbs back pressure at a gas-oil ratio of 800 to 1. It was given an allowable of 158 bbls. The well, which is two miles west of Cockfield production on the east flank of the dome, has a total depth of 10,715 ft, but was completed through perforations at 9447-70 ft.

Completion of the above good Sparta well should increase activity at Pine Prairie, which already is the most active spot in South Louisiana. Present activity centers on east flank Cockfield production opened last year, and where exception to M-68 spacing was granted several weeks ago. The past week Humble made location for four tests, raising to seven the number of operations started in the past two weeks. Three tests are drilling, 1 testing and one was completed the past week. Besides Humble and Texas, Gulf, Stanolind and Pan American are active in the field.

SOUTH LOUISIANA FIELD COMPLETIONS

Cameron Parish: Chalkley—Shell's Hanszen 15, 330 ft n and 2970 ft w se cor 22-1s-6w, pb 10,082 ft, set 5-in csg 10,083 ft, perf 10,051-75 ft, 300 bbls day 9/64-in ch, tp 2475 lbs, gor 860-1, td 11,005 ft.

Evangeline Parish: Ville Platte — Continental's Hirsh 9, 2800 ft nw and 1017 ft sw of e cor 44-3s-2e, 6-in 10,271 ft, perf 10,205-12 ft, squeezed; reperf 10,165-96 ft, flow 60 bbls fluid 14 hrs ¼-in ch; reperf after squeezing and made 130 bbls day 24/64-in ch, td 10,271 ft.

Continental's Ludeau-Haas Unit, 2050 ft n and 1725 ft e of sw cor 27-3s-2e, 6-in csg 10,241 ft, perf 10,198-205 ft squeezed, reperf 10,154-83 ft, 166 bbls day ¼-in ch, tp 1300 lbs, cp 2500 lbs, td 10,241 ft.

Continental's Adam Tate 1, Unit 36, 1550 ft nw and 1450 ft ne of s cor 43-4s-2e, td 10,178 ft, 6-in csg 10,178 ft, perf, 241 bbls day 12/64-in ch.

Evangeline Parish: Pine Prairie—Gulf's Easton Station-Fee 1, begin ne cor s¼ 37 go 1955 ft w and 325 ft s at right angles on 16.39-ac tr, 37-3s-1w, 5½-in 8236 ft, perf 8218-28 ft, 220 bbls, 5/32-in ch, tp 1800 lbs, td 8236 ft.

Plaquemines Parish: Grand Bay—Gulf's QQ State 10, Lse 195, 2870 ft e along s l fr sw cor and 565 ft n at right angles in 12-19s-19e, 5½-in 9984 ft td, perf 9945-53 ft, 200 bbls day ¼-in ch, tp 1795 lbs.

Plaquemines Parish: Potash—Humble's Orleans Levee Board 60, deep test, fr most northerly cor 14-18s-15e, go 2297 ft southwesterly along nwl sec then at right angles to second section line 660 ft southerly in 14-18s-15e, abnd 10,361 ft.

Plaquemines Parish: Quarantine Bay—Gulf's QQ State 31, Lse 195, 2700 ft e and 3938 ft n of sw cor 7-19s-17e, td 8390 ft, perf 8342-52 ft squeezed, reperf 8342-50 ft, 187 bbls day 4/32-in ch, tp 1450 lbs.

St. Martin Parish: Lake Chicot Extension—Amerada's Cass & Kruzweg 1, 2640 ft e of production, 2330 ft e and 2885 ft s of nw cor 31-11s-10e, 5½-in csg 9393 ft, perf 8186-89 ft and 8133-36 ft and squeezed, reperf 8156-77 ft 250 bbls day ¼-in ch, tp 400 lbs, td 9500 ft.

West Baton Rouge Parish: West Port Allen Extension—Amerada's Southern Land Products 1, one lcn e of production, 660 ft n and e swc 30-7s-12e, perf 9115-26 ft squeezed, reperf 9148-52 ft, 204 bbls day 9/64-in ch, tp 1300 lbs, gor 830-1, td 9889 ft.

SOUTH LOUISIANA WILDCAT COMPLETIONS

Iberia Parish: Atchafalaya Bay New Sand—Texas Co.'s State-Rabbitt Island 1, Lse 340, td 9348 ft, pb 8900 ft, set 5-in csg 8910 ft, perf 8668-72 in sand 8668-8715 ft, 5,000,000 gas ¼-in ch, slight spray dist, td 9348 ft.

St. Landry Parish: Failure—Sun's Boagni Est 1, n Opelousas area, 40-6s-4e, abnd 9406 ft.

SOUTH LOUISIANA WILDCAT STARTS

St. Mary Parish—Danciger's Allain 1, 2018 ft s and 135 ft w of nwc 46-13s-9e.

Vermilion Parish—Humble's Louisiana Land & Fur Co. 1, Pecan Island, fr swc 34 go easterly 660 ft along sl then northerly 660 ft at right angles in 34-16s-1e.

North Louisiana

Concordia Discovery Makes Flow of 136 Barrels Daily

Winn Parish wildcat to deepen. Concordia Parish discovery well officially gauged.

Winn Parish: H. L. Hunt's Goodpine F-24, C SW SE 13-12n-5w, near Calvin, has casing set at 8905 ft. The well is tight but shows of oil and gas were reported. Electrical survey was run and sidewall cores taken before casing was set. Steam was kept up in boilers for a week after production string was set, but finally crews were laid off and a string of small drill stem has been hauled in from Hunt's operations in LaSalle Parish.

Concordia Parish: In the new Lake St. John area opened by California Co.'s Pan-American 1, gauged 136 bbls per day on 15/64-in choke from Wilcox, while the No. 2 made 104 bbls on 16/64-in, 20 percent salt water. Operator staked No. 3 and No. 4 in 15-9n-10e. The discovery well is in Section 16.

NORTH LOUISIANA FIELD COMPLETIONS

Claiborne Parish: Haynesville — Phillips' Taylor 1, sw se 11-23n-8w, flow 36 bbls hr, ¼-in, cp 750, tp 500, perf 5249-74, 4000 gals acid, td 5340 ft.

Robert A. Stacy Taylor Unit 1, c sw sw 16-23n-8w, flow 35 bbls hr, ¼-in, cp 850, tp 550, perf 5319-54 ft, 5354-62 ft, 5378-86 ft, 4000 gals acid.

LaSalle Parish: Nebo—Lamar Hunt Trust Estate and Caroline Hunt Trust Estate's J. E. Hailey et al Unit 1, 2-7n-3e, flow 149 bbls, 12/64-in, tp 1000, cp 1400, gor 1946/1, perf Wilcox 3734-48, td 4050 ft.

Placid Oil Co.'s Goodpine F-93, 22-7n-3e, flow 66 bbls, 2 percent BS&W, 20/64-in, tp 700, cp 900, gor 19,424/1, perf Wilcox 3976-80 ft, td 4209 ft.

H. L. Hunt's Goodpine F-98, 39-7n-3e, flow 213 bbls, 12/64-in, tp 540, cp 620, gor 399/1, perf 4159-64 ft, 20 shots, td 4216 ft.

Grubb and Hawkins' Ward et al 1, 39-7n-3e, flow 55 bbls, open choke.

NORTH LOUISIANA WILDCAT COMPLETIONS

Caddo Parish: Failure—J. M. Hayner et al's Conley-Garland 1, 8-21n-15w, abnd 3030 ft.

Bienville Parish: Failure — Arkansas Fuel Oil Co.'s E. W. Merritt 1, 1638 ft e and 1663 ft n sw cor 13-7n-7w, abnd 7760 ft.

Concordia Parish: Lake St. John: Discovery—California's Pan-American 1, nw 16-9n-10e, flow 136 bbls, 15/64-in, perf 4567-71, swabbed in, 40-gr, had shown 59.5-gr from 8935-46, flowed 175 bbls distillate, 2,660,000 gas, 3/16-in, tp 3150, gor 15,300/1.

California's Pan-American 2, 2-9n-10e, 1000 ft e of No. 1, tested sw 4660-71, perf 4554-75, flow 104 bbls 16/64, 20 percent salt water.

NORTH LOUISIANA WILDCAT STARTS

Avoyelles Parish—Placid Oil Co.'s Thompson-Katz 2, c ne nw 35-3n-5e, lcn.

Bossier Parish — Continental's Crystal 1, 1650 ft n and 990 ft w se cor 21-21n-11w, lcn.

Caddo Parish—Gus K. Primos' Gerdes 1, 722 ft e and 330 ft ne from swc 4-14n-16w, lcn.

Claiborne Parish—Skelly's Kinnebrew 1, 660 ft n and 720 ft w of sec ne 26-20n-7w, rig.

ARKANSAS FIELD COMPLETIONS

Lafayette County: McKamie—Carter's Hanes 3, c ne 36-17s-24w, flow 192 bbls 11/64-in, perf 9240-70 ft, first porosity 9152-9161 ft, main porosity 9180-9304 ft, td 9330 ft.

Lafayette County: Midway — Barnsdall's Powell 2, 10-15-24, 24 bbls hr, 36.5-gr, ¼-in, Reynolds lime 6405 ft, td 6475 ft.

ARKANSAS WILDCAT START

Union County—Crescent Drilling Co.'s Root Petroleum Co. 1, c ne ne 25-18-15, dr.

MISSISSIPPI WILDCAT STARTS

Adams County—Sinclair-Wyoming Oil Co.'s Stowers 1, begin at nw cor sec 4, go s 15 degrees e 1050 ft, thence west 1000 ft to location in 16-8n-2w, dr.

Wilkinson County—Bering Oil Co.'s Crosley 1, c sw sw 10-3n-1e, spud and sd.

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Test Will Try for Heavy Oil in Oxnard Plains Area

Kern County wildcat try abandoned. Plans under way for further exploration in Oxnard area, Ventura County.

Kern County: Robert B. Moran has abandoned Beer 1, Section 19-26-19, South Devils Den area, after drilling into gray sand at 1608 ft. Both upper and lower zone equivalents of H. C. Morton test in this area showed some saturation but appeared non-productive.

Ventura County: Royalty Service Corp., Ltd., is completing plans for an exploratory well to be located 3 miles west and 1½ miles north of the City of Oxnard in the Oxnard Plains. Test will mark continuation of efforts to uncover a heavy oil field in the Oxnard Plains district which has been extensively prospected in past six years.

CALIFORNIA FIELD COMPLETIONS

Fresno County: Burrel—Amerada's Truman 4-6, 422 ft n, 401 e w¼ cor 6-17-18, flow 190 bbls 63.5-gr, 18/64-in bean, 31 ft perf 8020 ft, td 8295 ft, top Kreyenhagen 7611 ft, Temblor 5940 ft, Eocene 7980 ft Cretaceous 8062 ft, oil sand 7980-8003 ft.

Kern County: Coles Levee—Richfield's KCL-B 25-27, 2293 ft n, 1002 e sw cor 27-30-25, flow 1180 bbls 32.8-gr, 2-1½-in beans, perf 9328-9389 ft, td 9398 ft.

Kern County: Midway - Sunset—Richfield's Southwestern 10, 1055 ft s, 3374 e w¼ cor 2-31-22, pump 150 bbls 15.4-gr, perf 1066-1345 ft, td 1350 ft.

Los Angeles County: Rosecrans—Union's Howard Park 33, 1305 ft s, 412 w n¼ cor 18-3-13, flow 356 bbls 33.5-gr, ½-in bean, 299 ft perf 6492 ft, td 8171, pd 6494 ft.

Santa Barbara County: Santa Maria Old Field—Union's Squires 24, 1675 ft n, 3776 w se cor lease Sec. 26-9-34, pump 50 bbls 23.5-gr, 373 ft perf 3910 ft, td 3912 ft.

Tulare County: Trico area—Trico Oil & Gas Co.'s TWA Fee 1, center 16-24-33, No est, flowed gas, 40 ft perf 2540 ft, Top 1st Mya 2472 ft, td 2540 ft.

CALIFORNIA WILDCAT COMPLETIONS

Fresno County Failure: Jacalitos Hills area—Wilshire Annex Oil Co.'s No. 23-26E, 1533 ft s, 800 e nw cor 26-21-15, swabbed dry on showings 3775-3765 ft, abnd 3787 ft.

Fresno County Failure: Rasin City area—Seaboard, Tidewater, Union's STU 53-13, 990 ft n, 330 ec 13-15-17, Kreyenhagen 5994 ft, oil stained sands cored 5103-5113 ft, abnd 6065 ft.

Kern County Failure: Grapevine - Wheeler Ridge area—Richfield's Tejon Ranch 3, 316 ft s, 329 e w¼ cor 7-10-19, abnd hard shale, no showings, 8400 ft.

Kern County Failure: Mount Poso area—Texas Co.'s Lambert Lands 1, 990 ft s, 1650 e nwc 29-26-28, Vedder 1808 ft, grit 1811 ft, abnd 2010 ft.

Kern County Failure: Midway-Sunset area—Doyle Petroleum Co.'s Wilmac 2, 336 ft n, 330 w se cor 3-31-22, abnd 1535 ft.

Los Angeles County Failure: Puente Hills-Turnbull Canyon area—Robert S. Lytle's Corehole A, 15-2-11, cored two 20 ft oil sand intervals below 640 ft, abnd 1603 ft.

CALIFORNIA WILDCAT STARTS

Sacramento County: Rio Vista area—Standard's Terschuron 1, Sec. 27-4-3, spudding.

San Benito County: Ciervo area—Union's Friedman 1, Sec. 13-16-11, lcn.

Michigan

Two Pools Each Get Mile Extension

United Drillers & Producers' Blohm 1, N½ NW SW 28-15n-4e, Kawkawlin, Bay County, over a mile northwest of the closest producers, estimated good for 40 to 60 barrels daily following acid treatment in Dundee lime at 2943 ft. Extension believed to prove up from 600 to 900 acres and may add more flank development because of its structural position 20 ft lower than any previously completed producer.

Adams: Mogul Oil Co.'s McTaggart 1, C NE SE 35-19n-3e, Adams Township, Arenac County, swabbed and flowed 77 bbls first 10 hrs after acid to a Dundee lime pay between 2932 and 2941 ft. Well is a mile south of the old field.

Evart: Sun Oil Co.'s Wirth B-1, N½ NE SW 23-18n-8w, Osceola County, 1320 ft east of the Evart discovery, drilled the objective Dundee horizon dry at 3776 ft. Deepening to an undetermined level, probably the Monroe, is contemplated.

MICHIGAN FIELD COMPLETIONS

Allegan County: Hopkins—Spencer Cook's Wamhoff 1, nw ne nw 18-3n-12w, Traverse, abnd 1603 ft.

Bay County: Kawkawlin (extension)—United Drillers & Producers' Blohm 1, n½ nw sw 28-15n-4e, Dundee 2825 ft, pump 69 bbls, 2941 ft (mile nw extension).

Gulf's Wieland 1, n½ sw nw 35-15n-4e, Dundee, pump 75 bbls, 2915 ft.

Gulf's Meyer 1, n½ nw nw 12-14n-4e, Dundee, pump 70 bbls, 2863 ft.

Clare County: Headquarters—Pure's Thompson 1, n½ nw se 3-20n-3w, Traverse, abnd 3460 ft.

Clare County: Winterfield—Taggart Bros. Co.'s Deininger 116, c sw 27-20n-6w, Stray, 1,010,000 gas, 1323 ft.

Taggart Bros. Co.'s Wheeler 110, c sw 17-20n-6w, Stray, 390,000 gas, 1370 ft.

Taggart Bros. Co.'s Rouse 118, c nw 34-20n-6w, Stray, 5,400,000 gas, 1323 ft.

Taggart Bros. Co.'s Foster 117, c se 34-20n-6w, Stray, 1,500,000 gas, 1305 ft.

Taggart Bros. Co.'s Holbrook 1, c nw 9-18n-6w, Stray, 3,300,000 gas, 1479 ft.

Huron County: Bloomfield—Walter Markle's McDonald 1, ne sw ne 20-17n-14e, Traverse, abnd 1500 ft.

Isabella County: Mt. Pleasant-Chippewa—Daily Crude Oil Co.'s Davis 1, ne se ne 4-14n-3w, Dundee, abnd 3686 ft.

Van Buren County: Muskrat Lake—Jetter & deKraft's Munn 1, sw ne sw 12-1s-14w, Traverse, pump 40 bbls, 1288 ft.

MICHIGAN WILDCAT COMPLETIONS

Arenac County: Failure—Basin & Rayburn's Switzer 1, s½ se se 8-19n-4e, otd 2860 ft, abnd 4311 ft.

Kent County: Failure—Spencer Cook's Tertellet 1, se sw ne 6-10n-9w, abnd 2627 ft.

Osceola County: Failure—Turner Petroleum Corp.'s Hemund 1, c sw se 26-19n-8w, Dundee-Monroe 4080 ft, abnd 4235 ft.

MICHIGAN WILDCAT STARTS

Allegan County—C. W. Cook's Brandt 1, ne se se 21-3n-15w, lcn.

Clinton County—Grale Oil Co.'s Somerville 1, nw se ne 12-8n-1w, rig.

Lake County—Ohio's Consumers Power 1, n½ ne se 36-19n-12w, dr.

Ohio's Fairbanks 1, s½ sw ne 11-20n-14w, lcn.

C. L. Maguire's Horojko 1, sw se sw 2-17n-12w, rig.

Eastern States

NEW YORK COMPLETIONS

Allegany County—Bradley Prod. Corp., Nobles farm, Alma, 5 bbls, Richburg, 1311 ft.

Walter J. McEnroe, Huver farm, Bolivar, 10 bbls, Waugh-Porter, 1530 ft.

South Bolivar Oil Co., McKelvey farm, 5 bbls, Richburg, 1340 ft.

South Bolivar Oil Co., McKelvey farm, 5 bbls, Richburg, 1336 ft.

Ebenezer Oil Co., Vincent farm, Scio, 9 bbls, Richburg, 1145 ft.

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■ FOR SALE OR DEVELOPMENT: 4 producing Bartlesville sand 160 acre oil leases. All connected to pipe line. Attractive for flooding. Oil 33 to 37 Gravity. Will sell reasonable for part cash, balance in oil, or join with responsible parties in flooding. VEEDER SUPPLY & DEVELOPMENT CO., Cherryvale, Kansas.

Did you know that more men in the drilling-producing business subscribe to **The Oil Weekly** than to any other paper? If you want to buy, sell or exchange good used equipment, a low-cost advertisement in this column will get action for you in a hurry.

Richardson Pet. Co., Norton farm, Scio, 10 bbls, Richburg, 1235 ft.
J. F. McBride, Duke farm, Alma, 12 bbls, Richburg, 1279 ft.
Marsh Oil Co. Fay farm, Bolivar, 9 bbls, Richburg, 1429 ft.
E. B. Sage & Co., Vars farm, Bolivar, 8 bbls, Richburg, 1413 ft.
Olin & Helen Barnes, Costello farm, Willing, 5 bbls, Fulmer, 1264 ft.
Bradley Prod. Corp., Smith-Gray farm, Clarksville, 6 bbls, Richburg, 1329 ft.
Messer Oil Co., Koehler farm, Clarksville, 8 bbls, Richburg, 1365 ft.
G. W. Birtoil Est., Cady farm, Wirt, 5 bbls, Richburg, 1155 ft.

NEW YORK INTAKE WELLS

Allegany County—Bradley Prod. Corp., Nobles farm, Alma, Richburg, 1272 ft.
South Bolivar Oil Co., McKelvey farm, 1320 ft.
Sawyer Prod. Co., Beers farm, Bolivar, Richburg, 1347 ft.
Ebenezer Oil Co., Vincent farm, Scio, Richburg, 1120 ft.
Bradley Prod. Corp., Rolls farm, Alma, Richburg, 1180 ft.
Bradley Prod. Corp., Crandall farm, Scio, Richburg, 1365 ft.
McEbenwood Oil Co., McAndrews farm, Andover, Penny, 1327 ft.
Pat Oil Co., Shaughnessy farm, Alma, Fords Brook, 1346 ft.
Max Andrews, Burdick farm, Wirt, Richburg, 1371 ft.
Hill, Hughes & Keller, Hughes farm, Genesee, Richburg, 1340 ft.
Otto Oil Co., Bartlett farm, Bolivar, Richburg, 1169 ft.

OHIO COMPLETIONS

Ashland County—Ohio Fuel's Wilson 1, 0.74 gas, 2730 ft.
Ohio Fuel's Parker 1, abnd 1670 ft.
Frank Lyons et al's Young 1, 0.4 gas, 2920 ft.
Athens County—Preston Oil Co.'s Sunday Creek Coal Co. 1833, abnd 3575 ft.
Hocking County—Kachelmacher Estate, Poston 1, 0.3 gas, 433 ft.
Licking County—Ohio Fuel's Maharg 3, 0.6 gas, 2661 ft.
Loraine County—Ohio Fuel's Van Sickle 1, abnd 2312 ft.
Meigs County—Ohio Fuel's Russell 2, 0.04 gas, 1550 ft.
Pearl Ash et al's McCormick 3, 0.5 gas, 845 ft.
Morgan County—Litton & Radford's Matheney 2, 0.4 gas, 4268 ft.
Bern Oil & Gas Co.'s Williams 1, 1.25 gas, 866 ft.
Muskingum County—Industrial Gas Corp.'s Jenkins 11, abnd 3508 ft.
Noble County—Andrew K. Cline's Hupp 20, 2 bbls, 1830 ft.
Perry County—Pure's Williams 4, 136 bbls, 3248 ft.
Preston Oil's Keffer 1, 122 bbls, 3349 ft.
Ohio Fuel's Stimmel 1, 0.19 gas, 804 ft.
Preston Oil's Shaw 3, 5 bbls, 3329 ft.
Tuscarawas County—Natural Gas of West Va.'s Lebold 1, abnd 4614 ft.
Washington County—Graham Oil's Schenkel 1, 0.07 gas, 1646 ft.
Hall & Henning's Hall 3, 0.15 gas, 2109 ft.
H. H. Myers et al's Rheminschneider heirs 2, 1½ bbls, 1562 ft.

PENNSYLVANIA COMPLETIONS

Armstrong County—T. E. Rosensteel & Son's Beck 2, 0.35 gas, 1527 ft.
Equitable Gas Co.'s Boarts & Younts 1, 0.01 gas, 3308 ft.
Clarion County—Owens-Illinois Glass Co.'s Miller 2, abnd 3312 ft.
Sedgewick & Crumb's Males 1, 0.65 gas, 1065 ft.
Green County—Pittsburgh Steel Co.'s Fee 3, 30 bbls, 652 ft.
Mfgrs. Light & Heat Co.'s Orndoff 3, 0.72 gas, 3574 ft.
Washington County—Mingo Gas Co.'s Gamble 1, 1.96 gas, 1598 ft.
Westmoreland County—J. K. Sharp's Coulter 1, 0.07 gas, 3760 ft.

WEST VIRGINIA COMPLETIONS

Calhoun County—Francis E. Pettet's Roy Cain et al 1, abnd 2008 ft.
Clay County—Va. Gasoline & Oil Co.'s Brown, Swann & Goshorn V-1317, 3 bbls, 1845 ft.
Jackson County—Godfrey L. Cabot, Inc.'s McLean heirs 13, 0.25 gas, 5268 ft.
Godfrey L. Cabot, Inc., McLean heirs 14, 4.02 gas, 5272 ft.
United Carbon Co.'s Lewis 1, 5.63 gas, 5183 ft.
Kanawha County—So. Penn. Nat. Gas Co.'s Bostick 2, 1.99 gas, 1663 ft.
Lincoln County—Brawley Reid Oil & Gas Co.'s Horse Creek Land & Mining Co.'s 2, 0.3 gas, 2295 ft.
Monongalia County—C. H. Clovis' Clovis 1, 1 bbl, 1464 ft.
Ritchie County—Leavitt & Black's Jones 2, 5 bbls, 280 ft.
Roan County—O. H. Reed's Young 1, abnd 2640 ft.
Wayne County—Owens, Libby, Owen's Hoard-Baldwin 26, 0.32 gas, 1584 ft.
Wood County—So. Penn. Nat. Gas Co.'s McPherson 7, 5 bbls, 2289 ft.

Letters to the Editor

Political Ditch?

SIR:

I have just devoured the July 6 issue of THE OIL WEEKLY from cover to cover as usual, and while I have conceded defeat in the matter of the pipe line across Florida from Tampa to Sanford, I'd still like to know, for God's sake, what is behind the proposed canal across Florida at this time? I have heard in the last three days, that it was necessary to send three sets of Army engineers to make the canal survey before they could get one to recommend it. Is this true? Who is really pushing this canal?

Your magazine this week says that the shortage this winter will be acute, as regards fuel oils, but still there is arguing and jawing in Washington over these lines to the East, which could be built now, by Presidential order. Is all this debate now before the Senate just a some screen for the blasted canal?

I have letters from Mr. Parten and Mr. Ralph Davies advising that since tankers will not be available to bring oil to Tampa, they have recommended the Port St. Joe-to-Jacksonville route for the pipe line. Well, O.K.—Tampa is out. But, they go on to say that the line is to be limited to an eight-inch, with a capacity of only 35,000 bbls a day, because that is all the oil or gasoline that can be put into it by barge. But by damn, the canal seems to be going right on through, though it will have to have all its oil brought into it by barge. Does this make sense to you men? What is realy behind this rotten canal? Come on boys—you're none of you politicians, and all of you are buying bonds and paying taxes just like I am (and a hell of a lot of others down here), let's flush out the nigger in the woodpile. If there aren't enough barges to fill anything but an eight-inch line, how is this canal to be utilized? I say if we already had this canal it would be fine, but to set out now, when we're almost fighting for our lives and waste some $95,000,000 on a canal that will not be ready for three years (that's what Major Reybold says; I say it won't be in use for at least five years), and take steel and materials that are needed so badly elsewhere, is criminal. Remember, this canal will cut every main highway and rail line in Florida, and will call for at least 15 huge moveable bridges, besides the thousands of tons of steel and equipment to be used for the set of five locks. Think of it! And yet in nearly every article we read, and on every page of THE OIL WEEKLY, there is a cry of steel shortage. Hell, boys, the steel to be wasted in this canal could lay a 12-inch line from Port St. Joe to Jacksonville, with a capacity of 95,000 barrels daily, or better still, carry the line all the way from Jacksonville to New Orleans. And not with second-hand pipe either.

With seamen dying every day and ships being sunk for lack of protection in the Gulf, they would use the steel that would make sub-chasers and convoy craft to install this monstrosity of a canal. Hell, lay a double line from Port St. Joe to Jacksonville! That'll handle more oil than any damn canal ever will. Mr. Parten is quoted (page 13, THE OIL WEEKLY, July 6) as saying tankers will be used this winter. Well, if they are, why in hell don't they bring the oil into Tampa to a short, easily laid line, and keep 'em off that long haul around Florida and up the Atlantic Coast. Will somebody please set us poor saps straight on this? This is no time for graft or boon-doggling, and until we see the reasons for the canal, it sure looks like we're getting it.

JOSEPH G. HEYCK,
3003 San Nicholas St.,
Tampa, Florida.

If Mr. Heyck wants to call this canal a political monstrosity, we do not have it in our heart to contradict him. And while we agree that now is the time to adjourn politics at Washington, and get down to serious business, there seem to be a sizeable bunch of politicians up there who disagree with us.

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Men in the Industry's News

FRED JOBST is on leave of absence from Val R. Wittich, representative in New York City of Clark Bros. Company and others, to assume a special assignment with the compressor division of WPB in Washington. A graduate of Stevens Institute of Technology, before his association with Wittich, he was with Chicago Pneumatic Tool Company.

CHARLES E. WEBBER, formerly a gas engineer with Humble Oil & Refining Company with headquarters at Houston, has been appointed senior analyst in the natural gasoline section of the natural gas and natural gasoline division of OPC. He will serve as assistant to James E. Pew, section chief, and will be concerned primarily with reviewing projects and appeals for exceptions under Conservation Order M-68 as it applies to natural gasoline production.

DR. THOMAS MIDGLEY, JR., who applied tetraethyl lead in the production of high-octane gasoline, has been elected an honorary member of the National Academy of Science. He is chairman of the board of American Chemical Society and vice president of Ethyl Gasoline Corporation.

FRANK J. HILL has been elected vice president of Greene, Tweed & Company, New York packing manufacturer. He has been with the company since 1915 and has been its sales manager for many years.

ERNEST K. PARKS, consulting petroleum production engineer and Pacific Coast chairman of the American Petroleum Institute's Division of Production, and Geraldine Kibler, recently private secretary to L. L. Aubert, president, and J. L. Barneson, vice president, of Bankline Oil Company, were married June 18 at the home of Mr. and Mrs. Paul M. Paine of Brentwood, California. Mr. and Mrs. Parks will reside in Glendale, California.

WILLIAM M. BLACK was made a vice president of The American Brake Shoe and Foundry Company at a recent meeting of the board. Black has been president of American Manganese Steel Division of The American Brake Shoe & Foundry Company since 1940 and will continue in that capacity. He joined this division in 1912 and became its general sales manager in 1934 and vice president in 1935. He served as a lieutenant of ordnance in World War I. American Manganese Steel Division has six plants, the largest being at Chicago Heights, Illinois, where the general offices are located.

GAY CARROLL, controller of Humble Oil & Refining Company, has been elected president of the Houston Control of the Controllers Institute of America. S. G. Loy, assistant controller of Humble Pipe Line Company, was elected a vice president of the local group.

JOE SIFORD and Clair Bell, accountants, are additions to the Tulsa staff of Ohio Oil Company, having been transferred from Findlay, Ohio.

H. R. SELLS, engineer with Kerlyn Oil Company, has transferred from Oklahoma City to Sunray, Texas Panhandle.

FRED HULSIZER, land department of Sinclair Prairie Oil Company, Tulsa, has been elected president of the company's Employee's Recreational Association.

MAYBEN P. NEWBY, local auditor of Skelly Oil Company, has been elected vice president of the Kansas City Control of the Controllers Institute of America.

T. W. BURNS has been appointed as works manager of the plant of Superior Engine Division of The National Supply Company at Springfield, Ohio. Burns brings to his new position a thorough knowledge of factory methods, systems and production efficiency, gained through many years in shop management. He was for many years with Fairbanks, Morse & Company in various executive positions, and after some 12 years as works manager of that company's Beloit plant he resigned to accept a similar post with A. O. Smith Corporation at Milwaukee, where he has been until his recent decision to join The National Supply Company.

ALBERTO CRESPO, Minister of Development of Bolivia, was in Washington last week in connection with a program of American financial assistance for the Bolivian government. A portion of the program calls for aid for the Bolivian oil industry. A United States economic mission recently completed a survey of Bolivian economic affairs.

GEORGE D. LOCKE, former vice president of Barnsdall Oil Company, died June 30 at Rancho, Santa Fe, California. Burial was July 2 at Belmar, California.

WILLIAM L. NAYLOR, assistant controller of Gulf Oil Corporation, has been elected a vice president of the Pittsburgh Control of the Controllers Institute of America.

DAVID H. JANKE, Laredo district scout for Magnolia Petroleum Company, has been transferred to Houston to succeed Jack R. Wise, who has joined the Army. The Laredo vacancy has been filled by Jim F. Presley, who has been assistant chief scout in Dallas headquarters.

THOMAS JUSTIN STEUART, since 1931 assistant to the president of the Independent Petroleum Association in its Washington office, died July 6.

Steuart, who had served continuously in the Washington office, was known to oil men, legislators and Administration officials in the National Capital, both as a representative of his association and as the author of a biography of Wayne B. Wheeler, long head of the Anti-Saloon League, for which he had been publicity director. He also had been a Methodist minister, a newspaper reporter and editor of a Hartford (Conn.) newspaper.

G. RAYMOND, chief engineer for Black, Sivalls and Bryson, Oklahoma City, addressed the Engineers Club of Tulsa on "Buggies for Ideas," July 6. He stressed the inadequacy of the means of transferring engineering and other thought from one mind to another.

H. H. IHRIG, until recently in Illinois with Kobe, Inc., has been transferred to Tulsa.

Squeaks from the Bull Wheel

Full House

Good morning, Thompson. I hear you have a son and heir.

Yes, sir. Our household now represents the United Kingdom.

How is that?

Why, you see, I am English, my wife's Irish, the nurse is Scotch, and the baby wails.

Unexpected Help

I believe a burglar's trying to open the living room window.

Good! I haven't been able to move it since the painter was here.

Tourists

These rock formations were piled up here by the glaciers.

But where are the glaciers?

Gone back to get more rocks.

Right Answers

Officers like to tell about one colored cook, whom a Chief Petty Officer found one day whistling in the galley washing dishes.

"Here, what are you doing?"

"Yeah-suh, no-suh."

"What do you mean, yes'n and no'n me?"

"Well, boss, ah weren't quite sure what you all wanted and I reckoned one of dem was de correct answer."

Betting on Form

Have your parents consented to our marriage?

No, father hasn't expressed his opinion yet, and mother's waiting to contradict him.

Signs

Two travelers in Ireland, returning home late one night, lost their way.

Said one, "We must be in a cemetery. Here's a gravestone."

"Whose is it?" asked the other.

The more sober of the two, having struck a match, said, "I don't know but he seems to have lived to a ripe old age—175."

"See, can you read the name?" insisted his companion.

Another match having been lit—"I don't know him, some fellow called "Miles from Dublin."

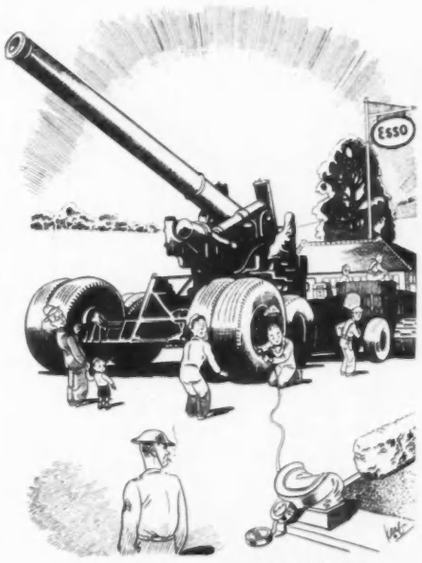
Life's Darkest Moments

"What's the matter, little boy?"

"Ma's gone and drowned all the kittens."

"Dear me, that's too bad!"

"Yeah, she promised me I could do it."



—Esso Marketer.

His Master's Voice

Emperor of Japan: "When we win this war I'm going to rule the world."

Mussolini: "No, you're not—I am, because the Lord said, 'The meek shall inherit the earth.'"

Hitler: "That's a lie—I never said any such thing!"

Screen Test

An American film producer was selecting a chief for his scenario staff. The producer insisted that the successful applicant must be a college graduate. He looked with favor upon one applicant, and asked if he had had a college education. The answer was in the affirmative.

"Show me your diploma."

The applicant tried to explain that it was not customary for college graduates to carry diplomas around with them.

"Well, then say me a big word."

Overdone

He ordered two dozen roses to be sent to his loved one on her twenty-fourth birthday. "A rose for every precious year of your life," his card read.

The florist threw in an extra dozen because the young fellow was one of his best customers.

And the wedding hasn't taken place yet.

Burbank's Joke

"What are you working on now?"

"I am trying to cross an egg-plant with a milk weed."

"What do you expect to get from that?"

"Custard pie."

The Landlubber

The American convoy was on its way to Ireland across the stormy North Atlantic. One soldier hurried below to call his buddy.

"Hey, come on up; we're passing an American battleship."

"I don't want to see no ship; call me when we're passing a tree."

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Welder

ERGOLYTE MANUFACTURING COMPANY

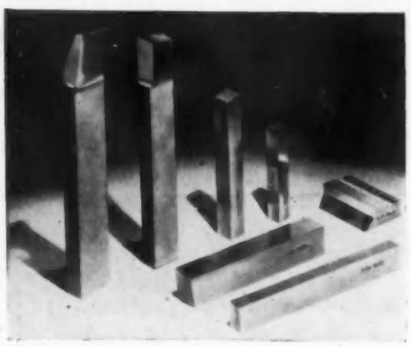
Ergolyte Manufacturing Company, Lawrence Street at Erie Avenue, Philadelphia, has announced development of a heavy-duty air-cooled arc welder, known as the 250 F. The new machine contains a built-in cooling system, and is heavier all around than its sister model the non-air-cooled Ergolyte 250.

Capable of handling an electrode from 116- to 3/16-inch, the new model has 24 heat steps, an input voltage of 230 volts and a current range from 15 to 250 amperes. The 250 F has a 60-cycle frequency and operates on a single phase or one phase of a two- or three-phase current. Special frequencies may be built to order.

Alloy for Machining Steel

HAYNES STELLITE COMPANY

Haynes Stellite Company, Kokomo, Indiana, announces "Stellite" 98M2 tools, made of a new cobalt-chromium-tungsten alloy especially designed to increase the speed of machining steel in production shops. Developed as part of a long-range research program by Haynes Stellite Company in cooperation with Union Carbide and Carbon Research Laboratories, Inc., the new alloy



"Stellite" 98M2 cutting tools are made in a variety of sizes and shapes suitable for machining steel.

represents another definite achievement in the field of metal-cutting tools, it was said.

Already thorough production tests on many types of steel have resulted in "Stellite" 98M2 tools being adopted on a large variety of machining operations on steel parts. The new tools machine steel at even higher cutting speeds than "Stellite" Star J-Metal or "2400" tools, with longer life between grinds. With 98M2 tools, heavy roughing cuts are being taken on steel turning jobs with coarse feeds—to get high rates of metal removal—yet tool life is long and economical, for the new alloy is well balanced in red hardness, edge strength, and toughness.

Where heavy feeds and high speeds are used for the fast removal of metal on production operations, "Stellite" 98M2 tools have been, in many instances, adopted as standard because of their high cutting quality and strength, and because they are not subject to excessive breakage.

The new alloy tools are available in standard square and rectangular solid bits, and in 20 standard styles of welded-tip tools of various sizes, for turning, facing, and boring. In addition, special tools, including solid bits or brazed-tip styles for grooving or forming special contours, are being made to users' specifications.

Motor Maintenance Notebook Available

A two-volume set of maintenance rules and suggestions is now available to maintenance men concerned with the care of electrical apparatus in industry.

Written by engineers of Westinghouse Electric and Manufacturing Company, the books total 220 pages and are made up of 15 chapters for loose-leaf insertion in 5 x 7-inch binders. Each chapter is brought up to date and additions will be made as conditions warrant.

Volume one covers inspection of electrical apparatus, insulation materials and applications, the cleaning, drying and testing of insulation, commutator maintenance, starting and regulating a-c, d-c and squirrel-cage induction motors. All the necessary information for proper maintenance of insulation and motors is given with diagrams, tables, and charts to make the text easy to follow.

Volume two is devoted to contactor maintenance, the inspection of transformers, and a chapter on transformer connections. A number of wiring diagrams embrace all of the more common connections for 2- and 3-phase, 25- and 60-cycle, power transmission.

Copies of maintenance hints notebooks are available to maintenance men from department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh.

Wire Screen

Newark Wire Cloth Company, Newark, New Jersey, has issued a handbook of information on wire cloth and other woven-wire products—a manual that is said to remove the mystery and risk from their application, selection and ultimate use. The book contains complete yet concise information on the widest range of wire-cloth products. There is a glossary of terms, instruction on how to compute mesh, space, open area, illustrations of weaves, a section on selecting, ordering and testing.

Recording Thermometer

The Bristol Company, Waterbury, Connecticut, has published a new bulletin Number T302, on its line of fully-compensated liquid-filled recording thermometers for temperatures between —125° and +400° F.

The bulletin gives detailed information concerning construction of the instrument, the various forms in which it is furnished, and also information concerning its application.

Union Wire Rope Corporation Awarded Navy "E"

Union Wire Rope Corporation, Kansas City, Missouri, has been awarded the Naval "E" for excellence in recognition of outstanding service to the war effort. Official presentation was made in a ceremony at the Kansas City plant July 8.

Rear Admiral W. C. Watts presented the blue banner to M. G. Ensinger, president of the corporation. John Haglein, the oldest employe of the company, accepted the "E" buttons for other workers.

Business leaders of the Kansas City area and a large delegation of Navy and Army officers were present. Guests included Captain S. C. Loomis, Inspector of Naval Materials for the Ninth Naval District; Commander D. W. Tomlinson; Mayor John B. Gage of Kansas City; Governor Payne Ratner of Kansas; Dwight H. Brown, Secretary of State for Missouri; R. H. Bartlett, chairman of the board of Union Wire Rope Corporation; E. H. Reedy and Phil D. Morelock, board members.

Weld Inspection Chart Published by Lincoln

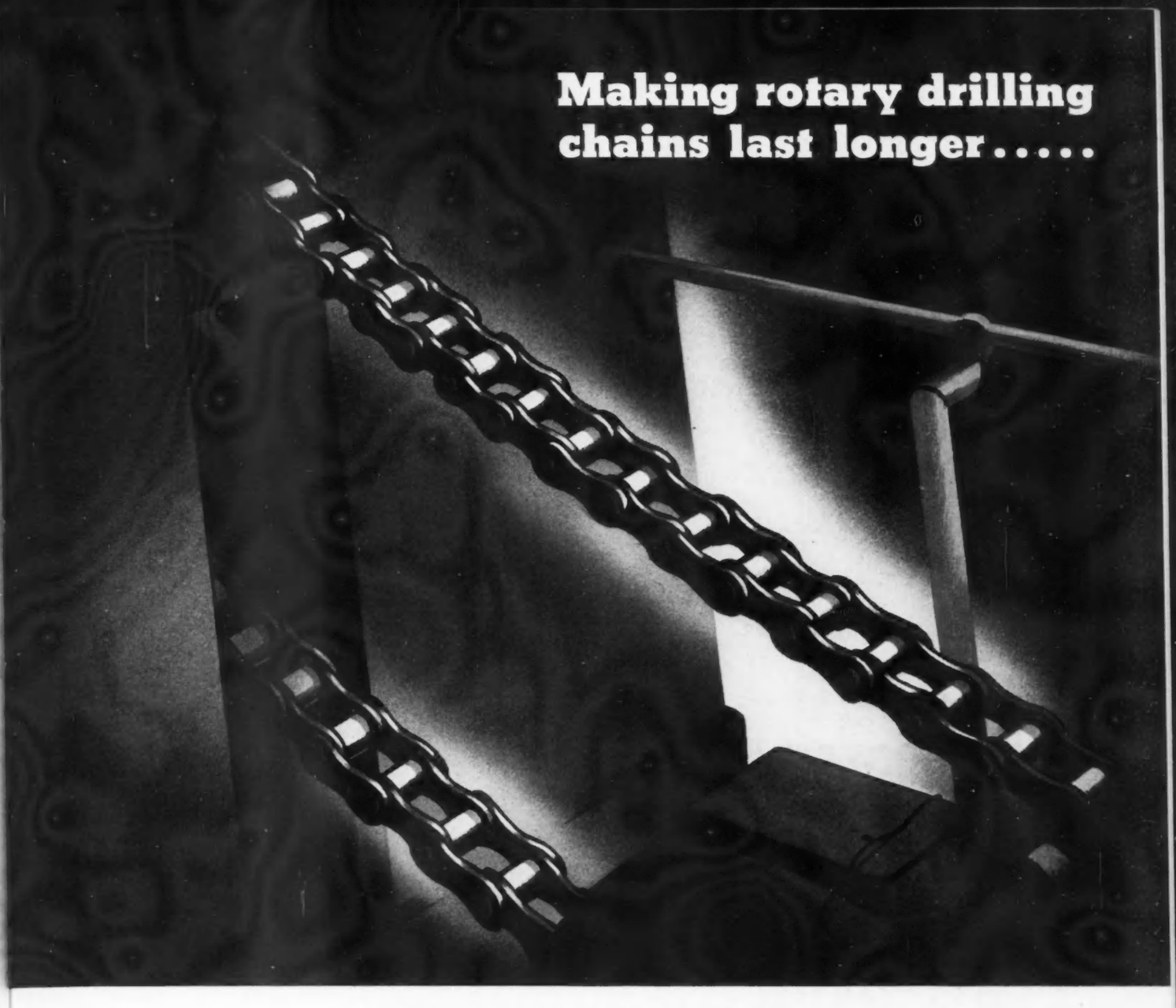
An arc welding inspection chart, which will provide welding inspectors and others concerned with weld production a simple and extremely helpful aid for use in inspecting welds, has been published by The Lincoln Electric Company, Cleveland, Ohio.

The chart presents graphically the different types of welds obtained when the work is done normally, with normal current, voltage and speed, as compared with those obtained when these factors are not normal.

"Upon inspection after welding, certain tell-tale signs will reveal considerable information to a qualified inspec-

Lincoln Welding Chart

Making rotary drilling chains last longer.....



Information supplied by "The Oil Weekly"

Life of rotary drilling chain may be extended by keeping in mind five simple rules:

(1) Sprocket wheels should be carefully lined up on the shafts. Faulty alignment is one of the most frequent causes of excessive wear.

(2) Chains should be run with less slack than a belt. Too much tension causes undue wear on the chain and on bearings. But not enough tension may allow chain to jump the sprocket or ride the teeth, causing breakage.

(3) Frequent lubrication is essential, and a good grade of lubricating oil should be used. Chain should be oiled on the inside (upper-side of lower run) while drive is running slowly.

(4) Cleaning of chain is important. This should be done by taking chain off, washing it well and dipping in light oil. Regular lubricant should be applied before it goes back into operation.

(5) Sprocket wheels should be inspected from time to time to make sure that they do not unduly wear the chain. Repair worn sprockets by having them ground to shape of teeth.

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tor," according to A. F. Davis, vice president of the company.

"Items to consider in inspection after welding include the size and shape of bead, appearance of the bead, undercut, overlap, location of craters (indicating where the operator started and stopped welding). A study of the weld and proper interpretation of tell-tale signs will disclose other conditions of welding."

These conditions are illustrated by enlarged and detailed photographs on the chart.

Accompanying the photographs is a table indicating the burn-off of the electrode, the penetration of fusion, the appearance of the bead and the sound of the arc with each value of current, voltage and speed of welding. For example, with normal current, voltage and electrode speed, burn-off of the electrode gives a normal appearance of the weld coating, a fairly deep and well-defined penetration, excellent fusion of the bead with no overlap, and an arc that burns with a sputtering hiss plus sharp cracking.

The inspection chart also illustrates the use of the "Fleet-Fillet" technique of welding, developed by The Lincoln Electric Company. The chart also illustrates how the speed of welding increases as the size of the electrode increases.

The chart is available free of charge to inspectors of welding and others concerned with welding.

Pacific Pump Works Officials Visit Plants

To personally survey the extensive plant expansion now completed by the Pacific Pump Works, executives of that company of affiliated eastern companies met in Los Angeles, June 22, 1942. In this group were J. B. O'Connor, vice president of Clark Bros. Company and chairman of the board of directors of Pacific Pump Works; C. P. Clark, president of Clark Bros. and vice president of Dresser Corporation; A. R. Weis, president and Elmer Weis, vice president of the Pacific Pump Works. Pacific Pump Works and Clark Brothers Company are affiliates of the Dresser Corporation, as is the Bryant Heater Company of Cleveland.

Hints on Saving Through Good Operating Practices

Designed to help get maximum production from equipment and eliminate unnecessary shut-downs, a new operating practice manual, just published by Johns-Manville, 22 E. 40th Street, New York, gives many practical suggestions on getting better service from maintenance materials. Called "101 Suggestions for Good Operating Practice," (Form PP-9A) the guide outlines in tabular form many hints on lengthening the life of packings, insulations, roofings, friction materials, and refractory products.

Blocks

Oil Well Supply Company, Dallas, Texas, has issued the following new bulletins: B1-342 for No. 250 crown block; B2-342 for No. 350 crown block; B3-542 for No. 110 crown block; B4-542 for 80-inch streamline traveling block; B5-542 for 66-inch streamline traveling block; B6-542 for 60-inch streamline traveling block; B7-542 for 15-inch—200 crown block.

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